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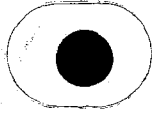
Port Arthur Facility
Construction Drawings



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Instructions for Using Auto Titrator System for Sulfides and Mercaptans

1. If you walk up to the screen and it is blank, just hit one of the side arrows.
2. Hit the S-RSH Method by just touching it.
3. Enter sample ID by just touching anywhere on the ID portion of the screen. Add letters or numbers as needed. To change from one to another just touch the upper right side box that will have either a number or letter in it.
4. Hit OK once you have entered your ID.
5. Hit the sample weight portion of the screen to enter your sample weight.
6. Get a beaker and tare it by sliding open the balance door on the right side and placing your beaker on the scale. Hit the "0" on the front of the scale to zero your beaker weight.
7. Add approximately 0.1 grams (or around 4 to 5 drops) of sample. Close the scale door. You will see a "0" on the right of the weight screen disappear when the weight is stable.
8. Hit OK.
9. Remove beaker from scale and add approximately 50 mL of ammoniacal caustic, which is sufficient to cover the electrodes.
10. Place beaker with sample on titrator by turning blue ring clockwise to remove storage solution (water with a drop of sulfuric acid), placing beaker up onto titrator, and then retightening beaker by turning blue ring counter clockwise.
11. Hit "Start" on the screen.
12. Computer will ask if sample is ready, just hit the ok.
13. Sample is now running.
14. When complete, remove beaker, rinse electrodes with water and replace with beaker containing water with a drop of sulfuric in it for storage.

Pointers for running the sulfide and mercaptan sulfurs on the auto titrator.

For sulfide and mercaptan sulfur, weigh approximately 0.1 grams.

Sulfide breaks will be in the region of -800 up to around -500 mv. If the titration starts in the -300 region or lower, you have no sulfides present.

The silver sulfide that is formed during the titration is always very dark looking and will cause the solution to appear almost black. Mercaptan sulfur reacting with the silver nitrate will be any color other than the dark brown to black. Its break point will always come after any sulfides have titrated.

The results will show a R1 and R3. The R3 is the value to use if there are no sulfides present, and is always twice the value of the R1 value. If there are sulfides present, then ignore the R3 value. Any multiple mercaptan breaks will be totaled at the end of the report.

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Construction Drawings

**TABLE OF
CONTENTS**

CES Port Arthur Facility

Construction Drawings

Table of Contents

Section	Title
1	Project Information
2	Sodium Hydrosulfide Manufacturing (SHM - 1) (PFD)
3	P&ID: PA – 101 "Nash Production Feed Tank"
4	P&ID: PA – 102 "Pump A & B Treatment Tanks for Nash Production Feed Tank"
5	P&ID: PA – 103 "Knock Out Tank"
6	P&ID: PA – 104 "Nash Tank"
7	P&ID: PA – 105 "Acid & H ₂ O ₂ Injection Tank Layout"
8	P&ID: PA – 106 "Fresh Caustic Supply Tank"
9	P&ID: PA – 107 "Wastewater Tank"
10	P&ID: PA – 108 "Sulfidic Oil / Caustic Separator"
11	P&ID: PA – 109 "Scrubber Flare System"
12	P&ID: PA – 110 "Truck and Barge Caustic Receiving"
13	P&ID: PA – 111 "Treatment Tanks 1 & 2 Wastewater Tank"
14	P&ID: PA – 112 "Filter Press"
15	_____
16	_____
17	_____
18	Flare Base Plate Detail (Tornado Technologies)
19	A. CES PA Site Warehouse Plan View "Inorganic Chemical Mixing Operation" (Minimum Process) B. CES PA Site Warehouse Plan View (Whole Process) C. CES PA Site Warehouse Plan View (COPA)
20	CES PA Site Soutex Plan View Tract I & II Legal Description

Safety Bulletin

U.S. Chemical Safety and Hazard Investigation Board



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SODIUM HYDROSULFIDE: PREVENTING HARM

Introduction

Since 1971, reported incidents involving liquid solutions of sodium hydrosulfide (NaHS) have resulted in 32 deaths and 176 injuries, most notably in the leather tanning and pulp and paper industries. The most serious safety concern associated with NaHS is its capacity to produce large amounts of deadly hydrogen sulfide gas (H_2S) when it reacts with an acid or is exposed to high heat.

Despite its pungent rotten egg odor, H_2S can deaden the nerves that detect odors, thereby preventing those exposed from being able to smell life-threatening airborne concentrations. This condition is referred to as "olfactory fatigue" and must be considered when designing NaHS safety systems.

This Safety Bulletin is published to increase awareness of the hazards associated with NaHS and to outline safety practices to minimize the potential for harm to workers and the public.

Defining the Problem

NaHS releases highly toxic H_2S if mixed with an acid or if exposed to excessive heat. Because it is corrosive, it is also potentially harmful to the skin and eyes.¹

NaHS incidents typically involve the following three elements:

- An inadvertent spill, leak, or mixing, whereby NaHS reacts

with an acidic solution to produce H_2S .

- Absent or inadequate engineering controls, such as ventilation or H_2S detection devices, coupled with inadequate PPE.
- Inappropriate emergency response actions by workers and emergency responders (Figure 1).

This bulletin reviews selected NaHS incidents that caused death and injury, for example:

- Delivery drivers inadvertently transferring NaHS into acid storage tanks. (See Whitehall Leather, Horween Leather, and Prime Tanning case studies on pages 13–15.)

¹ Although this bulletin addresses the hazards associated with NaHS solutions, its precautions also apply to other sulfide-containing substances (e.g., sodium sulfide), which are often used interchangeably with NaHS, and which also generate H_2S when mixed with acids.

Sodium Hydrosulfide

Common synonyms:

NaHS (NaSH)
Sodium bisulfide
Sodium sulfhydrate
Sodium hydrogen sulfide
Sodium mercaptan

CAS No.: 16721-80-5

UN No. (solution): 2922
(Figure 2)

DOT Hazard Class: 8 (Figure 2)

EPA Hazardous Waste No.:
D003

• Figure 1. Emergency responder in NaHS and H_2S protective gear.



- Figure 2. Shipping placard with UN number and DOT hazard class.



- NaHS being allowed to mix with acids in plant sewer systems. (See Georgia-Pacific and Westvaco case studies on pages 13-14.)
- Mixing of NaHS and an acid inside a common spill containment. (See Powell Duffryn case study on page 13.)

CSB Safety Bulletins offer advisory information on good practices for managing chemical process hazards. Case studies provide supporting information. CSB Investigation Reports comprehensively review all the causes of an incident.



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CSB identified the following two common management failures during its review of catastrophic NaHS-related incidents:²

- Failure to identify and mitigate hazards during process system design and engineering.
- Failure to manage hazards that were not controlled through good design and engineering.

Physical Characteristics and Uses of NaHS

Typical NaHS solutions are produced commercially by combining H₂S with caustic soda (NaOH), as shown in the following reaction:



The resulting finished solution has a pH of approximately 11.5. Depending on its solution strength (22 to 60 percent NaHS), it is heated to 71 to 82 °C to prevent crystallization. NaHS is sold commercially in both solution and flake forms, with solutions accounting for about 80 percent of total U.S. production.³

² CSB compiled the incident data and safety practices described throughout this Safety Bulletin during a comprehensive review of NaHS incidents and industry handling practices.

³ Total U.S. production for all forms of NaHS was approximately 269,000 tons in 2003.

Table 1 summarizes the general physical properties of NaHS solutions.

Table 1
Physical Properties of NaHS

Molecular weight: 56.1
Specific gravity: 1.152 (a)–1.376 (b)
pH of solution: strongly alkaline (11–12)
Solution freezing point: –15°C (a) – 40°C (b)
Odor: rotten egg
H₂S flammable limits (% H ₂ S in air):
Lower: 4
Upper: 44

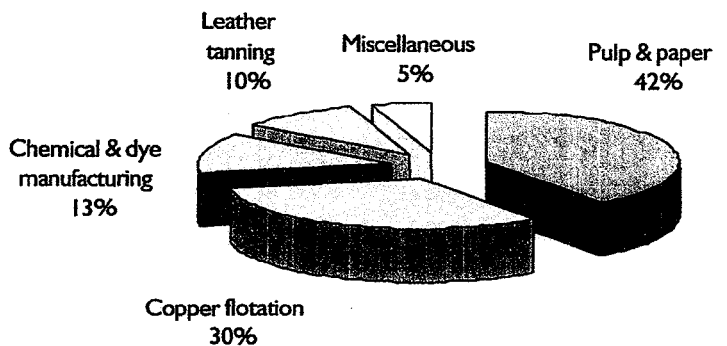
(a) 22% solution.

(b) 60% solution.

NaHS is used in a variety of industries (Figure 3):

- In the pulp and paper industry, to remove lignin from wood chips.
- In mining, as a flotation agent to separate impurities.
- In manufacturing, as a raw material or purifying agent.
- In the leather-tanning industry, to remove hair from hides.

● Figure 3. NaHS use by industry sector.



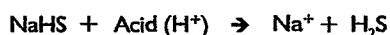
The Innovation Group

ACGIH: American Conference of Governmental Industrial Hygienists
AICHE: American Institute of Chemical Engineers
AIHA: American Industrial Hygiene Association
ANSI: American National Standards Institute
ASSE: American Society of Safety Engineers
ATSDR: Agency for Toxic Substances and Disease Registry, DHHS
°C: Degrees Celsius
CAS: Chemical Abstracts Service
CCPS: Center for Chemical Process Safety, AIChE
CDC: Centers for Disease Control and Prevention, DHHS
CFR: Code of Federal Regulations
CO₂: Carbon dioxide
CSB: U.S. Chemical Safety and Hazard Investigation Board
DHHS: U.S. Department of Health and Human Services
DOE: U.S. Department of Energy
DOT: U.S. Department of Transportation
EPA: U.S. Environmental Protection Agency
ERPG: Emergency Response Planning Guidelines, AIHA
H: Hydrogen
H₂O: Water
H₂S: Hydrogen sulfide
HazCom: Hazard communication, OSHA
IDLH: Immediately dangerous to life or health
MIT: Massachusetts Institute of Technology

MSDS: Material safety data sheet
Na: Sodium
NaHS: Sodium hydrosulfide
NaOH: Sodium hydroxide
NAS: National Academy of Sciences
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health, DHHS
NLM: National Library of Medicine, National Institutes of Health (NIH), DHHS
NRC: National Response Center, USCG
NTSB: National Transportation Safety Board
OSHA: Occupational Safety and Health Administration, U.S. Department of Labor
PEL: Permissible exposure limit, OSHA
pH: Potential of hydrogen
PPE: Personal protective equipment
ppm: Parts per million
PSM: Process safety management, OSHA
PTFE: Polytetrafluorethylene
REL: Recommended exposure limit, NIOSH
SCBA: Self-contained breathing apparatus
SO₂: Sulfur dioxide
STEL: Short-term exposure limit
TWA: Time-weighted average
UN: United Nations
USCG: U.S. Coast Guard
WEEL: Workplace emergency exposure limit, AIHA

Health Hazard Summary

Because NaHS is corrosive, it presents a hazard to unprotected skin and eyes. However, its most serious hazard is its propensity to produce toxic H₂S gas when mixed with an acid or exposed to high heat sources such as a fire. The acid reaction chemistry is shown as:



Inhalation

The gases released by NaHS are corrosive and may contain high levels of H₂S. Inhalation of H₂S is irritating to the nose and throat. At higher concentrations, it can produce olfactory fatigue, a buildup of fluid in the lungs (pulmonary edema), severe shortness of breath, and death. Table 2 outlines the health effects of inhaling H₂S.

● H₂S exposures may cause olfactory fatigue

Continuous exposure to low concentrations (5 to 10 ppm) of H₂S or brief exposure to higher concentrations (above 50 ppm) deadens the odor-detecting nerves in the nose and lessens the ability to smell dangerous concentrations. The higher the concentration of H₂S, the faster the onset of olfactory fatigue.

Eye Contact

Corrosivity hazard

Because of the high pH of NaHS solutions (approximately 11.5), contact may severely irritate and burn the conjunctiva and cornea,⁴ and may result in permanent tissue damage.

Hazard from generated H₂S

Exposure to low concentrations of H₂S over several hours or days may

⁴ The conjunctiva and cornea are the thin, transparent tissues that cover the outer surfaces of the eye.

result in "gas eyes" or "sore eyes," with symptoms of scratchiness, irritation, tearing, and burning. Symptoms are likely to disappear when the exposure ends. Prolonged exposure to concentrations of H₂S above 50 ppm may cause permanent damage or intense tearing, blurring of vision, and pain when looking at bright light.

Skin Contact

Skin contact with NaHS may produce pain, irritation, redness (erythema), or burns. Because the symptoms of exposure severity may

Table 2
Inhalation of H₂S

Concentration (ppm)	Health Effects (a)
0.05	Rotten egg odor detectable by most humans.
0.13–30	Obvious and unpleasant odor.
50–150	Olfactory fatigue (temporary loss of smell) and marked dryness and irritation of nose and throat. Prolonged exposure may cause runny nose, cough, hoarseness, headache, nausea, shortness of breath, and severe lung damage (pulmonary edema).
200–250	Worsening and more rapid onset of the above health effects; possible death in 4 to 8 hours.
300–500	Excitement, severe headache and dizziness, staggering, unconsciousness, and respiratory failure likely in 5 minutes to 1 hour; possible death in 30 minutes to 4 hours.
500+	Rapid onset of severe toxicity, respiratory paralysis, and death. If not fatal, may cause long-term effects such as memory loss, paralysis of facial muscles, or nerve tissue damage.
800–1,000	May be immediately fatal after one or more breaths, resulting in an instant unconsciousness or "knock-down" effect.

(a) Data from NIOSH, NLM, and ATSDR.

be delayed, affected skin should be treated immediately. (See the first aid guidance on page 12.)

Ingestion

Ingesting a small amount of NaHS in a single dose will likely produce only minor throat irritation or burning of the esophagus. Ingesting a larger quantity, however—or small quantities over an extended period—may seriously damage the gastrointestinal tract. In addition, NaHS that mixes with stomach acids produces H_2S and may cause the health effects associated with inhalation (Table 2).

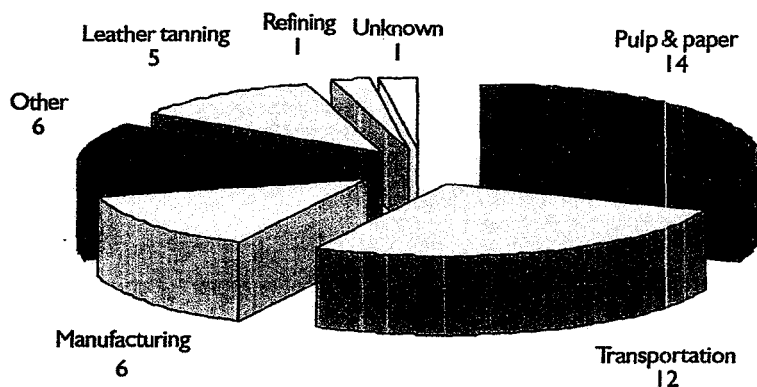
Incident Data

From reported data for the United States from 1971 through 2004, CSB identified 45 NaHS-related incidents in six industry sectors (Figure 4).⁵ Collectively, these incidents resulted in:

- 32 fatalities.
- 176 injuries.
- 351 medical evaluations.
- At least 10 plant or community evacuations.

⁵ The earliest recorded NaHS incident identified during the CSB review occurred in 1971. Regulatory reporting requirements and industry usage practices have changed significantly since that time, which may account for incident rate fluctuations among the various industry sectors. For example, nearly all of the leather-tanning incidents occurred between 1971 and 1990, and no transportation incidents were reported prior to 1990. The incidents CSB reviewed include pulping-liquor incidents in which NaHS was used as the sulfide source.

Figure 4. NaHS incidents* by industry sector.



*An "incident" is a NaHS-related event involving a fatality, injury, medical evaluation, or evacuation.

Thirty-six of the incidents resulted from H_2S releases, and the remainder from skin or eye exposure to NaHS solutions.

The following causal categories were identified during this review:

- Improper mixing or transfer: 15 (33 percent).
- Spills: 12 (27 percent).
- Mechanical failure: 7 (16 percent).
- Improper maintenance or repair: 6 (13 percent).

Five of the 45 incidents (11 percent) were attributed to unknown causes.

Incident data were obtained from OSHA, EPA, and ATSDR databases, as well as industry questionnaires, interviews, and media sources. Only those incidents that were reported and accessible are represented.

Although the incidents reviewed are not all-inclusive, their number and severity clearly indicate that NaHS presents a serious hazard in the workplace.

Prevent Harm

Good safety management includes identifying and evaluating hazards during initial process planning and design, and continues throughout the life cycle of the operation—both for new processes and for modifications. This approach allows managers and employees to understand and address hazards prior to startup.

Hazard control measures such as work practice controls and PPE are secondary layers of protection. They should be considered only after attempting to eliminate hazards through design and engineering, or when substituting

for a less hazardous material or process is impractical.

A multidisciplinary team applying established process safety management principles should identify and evaluate hazards. These principles are outlined in the OSHA Process Safety Management of Highly Hazardous Chemicals (PSM) Standard and in CCPS publications listed at the end of this bulletin.

The PSM Standard regulates processes containing threshold quantities of highly hazardous chemicals, explosives, and flammable liquids in amounts exceeding 10,000 pounds.⁶ NaHS is not a PSM-covered chemical because—despite its reactive potential to produce large amounts of H_2S when mixed with acids or when exposed to heat—it does not meet the OSHA listing criteria.

CSB has recommended that OSHA expand PSM to include chemicals with reactive characteristics similar to those exhibited by NaHS (i.e., relatively stable chemicals that react dangerously with other substances).⁷ (See the CSB Hazard

Investigation Report, *Improving Reactive Hazard Management* [2002; <http://www.csb.gov>].)

Design to Eliminate Hazards

Process systems must be designed to prevent NaHS from inadvertently mixing with acidic solutions. The potential for human error during handling should be identified and eliminated to the maximum extent practicable.

Interviews and literature reviews with NaHS manufacturers, trade associations, and industry representatives highlighted the following design practices:

- Always treat sewers as extensions of the process. Do NOT add wastes without analyzing for compatibility with other sewer contents.
- Separate acid- and NaHS-containing waste streams, or design the system to handle mixing so as to prevent an uncontrolled or otherwise hazardous release of H_2S .
- Construct separate containments for NaHS and acid storage containers and process equipment.
- If waste NaHS and acids are mixed in a sewer, install waste-stream/sewer monitors with alarms to warn employees of system upsets or unfavorable acid conditions.
- Install ventilation systems and H_2S detectors and alarms at locations where hazardous concentrations may occur (e.g.,

storage areas and offloading terminals).

- Design storage tank vents to minimize the potential for worker exposure.
- Design transfer connections and procedures to prevent inadvertent mixing. Limit access to these connections to trained and authorized personnel through reliable and effective controls, which should include procedures and physical barriers (e.g., locking devices or unique fitting configurations).
- Construct process system components from materials capable of withstanding the corrosivity and temperatures associated with NaHS solutions. NaHS manufacturers recommend the following materials:⁸
 - ◆ Storage tanks and steam coils: 304 stainless steel.
 - ◆ Pumps: 304L or 316L stainless steel.
 - ◆ Packing: PTFE-impregnated carbon fiber.
 - ◆ Piping: 304L stainless steel, insulated and heat-traced in locations where freezing may occur.
 - ◆ Gaskets: Spiral-wound 316L stainless steel or a PTFE ring.
 - ◆ Plug valves: Lubricated or made with a PTFE sleeve and seal.

⁸ This information illustrates the types of materials manufacturers recommend for use in NaHS process systems. It is not intended as a substitute for recognized and generally accepted good engineering practices for the specific facility design, construction, or maintenance.

⁶ See 29 CFR 1910.119 at <http://www.osha.gov/SLTC/processsafetymanagement/>. Highly hazardous chemicals are listed in Appendix A.

⁷ Based on their reactive characteristics, the chemicals included in Appendix A were selected from the 1975 version of NFPA 49, *Hazardous Chemical Data*. OSHA selected only those chemicals with instability ratings of "3" or "4" (on a scale of 0 to 4). These ratings focus purely on the chemicals themselves and do not consider the consequences of mixing with other chemicals.

● H₂S hazard: separate NaHS and acids

Allowing spilled NaHS to inadvertently mix with an acid (pH < 7) poses a significant risk of harm. Similarly, if a sewer system is not designed to control H₂S, allowing NaHS to run off to a sewer containing acids also poses a significant risk. Large amounts of toxic (and flammable) H₂S may evolve very rapidly!

Manage Hazards

Eliminating hazards through process design and engineering is the optimal hazard management system. However, additional systems are required when design and engineering do not eliminate these hazards. CSB identified the following management systems as particularly applicable to NaHS users.⁹

Communicate hazards to employees

The OSHA HazCom Standard (29 CFR 1910.1200) is based on the simple concept that employees have both a need and a right to know of the hazards associated with chemicals to which they are exposed. They also need to know

how to protect themselves from adverse health effects due to chemical exposure. The general requirements of this standard are outlined at <http://www.osha.gov>.

The HazCom requirements pertaining to NaHS MSDSs and H₂S training are outlined below:

- **MSDSs:** Employers are required to obtain an MSDS for each hazardous chemical (present or produced at the facility) and to make them readily available to workers. The information contained in MSDSs may vary significantly among NaHS manufacturers.¹⁰ Operations and safety personnel should, therefore, attempt to acquire a better understanding of NaHS hazards through such resources as this Safety Bulletin, MSDSs and product information from multiple NaHS manufacturers, and databases such as the NLM Hazardous Substance Data Base.¹¹
- **Training:** Employers are required to train their employees and inform contractors (including delivery drivers, construction workers, and emergency responders) of site-specific NaHS and H₂S hazards, including plant hazard labeling systems and locations of MSDSs.¹² This is often

accomplished during a facility safety orientation.

Provide personal protective equipment

Facilities should rely on PPE only after conducting a hazard assessment, as required by the OSHA Personal Protective Equipment, General Requirements Standard (29 CFR 1910.132).¹³ Employees should participate in the selection of PPE because of the potential for stress and discomfort created by restrictions to movement, vision, and dexterity. Where practical, PPE should be simple to operate and reasonably comfortable to wear for the duration of the exposure.

- **Chemical protective clothing:** PPE required to protect workers from the corrosive hazards associated with NaHS includes eye and face protection, chemical protective gloves, protective clothing, and foot protection (<http://www.cdc.gov/niosh>).
- **Respiratory protection:** Before relying on respirators, facilities must have determined that it is impractical to eliminate or control exposures through substitution of a less hazardous chemical, design and engineering controls, or work practice or administrative controls. If respiratory protection is required, employers must comply with the OSHA *Respiratory Protection Standard* (29 CFR 1910.134).¹⁴

⁹ The safety programs outlined in this section relate to circumstances identified in the incidents CSB reviewed. Other relevant safety programs—such as management of process change, line breaking, lockout/tagout, and process and equipment integrity—are also extremely important components of a successful accident prevention program.

¹⁰ See <http://www.csb.gov> and <http://www.osha.gov> for discussions of MSDS inconsistencies and inaccuracies.

¹¹ <http://toxnet.nlm.nih.gov/index.html>.

¹² See *Safety Requirements for H₂S Training Criteria* (ANSI Z390.1-1995, available at <http://webstore.ansi.org/ansidocstore/default.asp>) for a model H₂S training program.

¹³ <http://www.osha.gov/SLTC/personalprotectiveequipment/>.

¹⁴ <http://www.osha.gov/SLTC/respiratoryprotection/>.

Table 3
H₂S Exposure Limits (ppm)

OSHA (PEL)	
Ceiling (a)	20
10-minute peak (b)	50
NIOSH	
IDLH (c)	100
REL	10
(10-minute ceiling) (d)	
ACGIH	
15-minute STEL (e)	15
8-hour TWA	10

(a) Concentration generally not to be exceeded during the work shift.

(b) Workers may be exposed above the ceiling level up to this concentration for a maximum of 10 minutes.

(c) Exposure to environments exceeding this airborne concentration is likely to cause death or permanent adverse health effects or to prevent escape. Use of SCBA in pressure-demand or positive-pressure mode is required (see 29 CFR 1910.134).

(d) Exposure should not exceed the REL for any continuous 10-minute period during the work shift.

(e) Exposure should not exceed this level for any continuous 15-minute period during the work shift.

NIOSH¹⁵ has certified certain negative-pressure, air purifying respirators for use where H₂S concentrations exceed the OSHA PELs (Table 3).¹⁶ For situations where concentrations are unknown or exceed equipment protection limits, NIOSH prescribes supplied-air respirators. These requirements are outlined in the NIOSH *Pocket Guide to Chemical Hazards* (2003; <http://www.cdc.gov/niosh/npg/npg.html>).

- **Air monitoring for H₂S:** In environments that are normally safe, but which pose the risk of hazardous H₂S exposure, the only way to ensure worker safety is to continuously monitor the air. In recent years, H₂S monitors have become much smaller, more rugged and reliable, simpler to operate, and much less expensive. Examples of available devices are noted below:

- ♦ **Personal H₂S detectors with audible, vibrating, and visual alarms:** These detectors can be clipped into a shirt pocket or worn on a hard hat. They are relatively inexpensive and reliable, and have low-maintenance electrochemical sensors and long-lasting batteries.

¹⁵ OSHA relies on NIOSH as the testing and certifying body in 29 CFR 1910.134. NIOSH requires end-of-service life indicators for filters used to protect against chemicals with poor warning properties, such as H₂S.

¹⁶ See Table Z-2, 29 CFR 1910.1000, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9991.

- ♦ **Stationary H₂S detection and notification systems:** These systems provide alarm notification 24 hours a day and can be used to automatically notify emergency responders. Freestanding solar- and battery-powered systems are also available that can be equipped with radio transmitters to send real-time monitoring results to a remote alarm or warning device.

Enter confined spaces safely

Because H₂S is heavier than air, it tends to concentrate near or below ground level, especially where there is limited air movement. Sump pits, storage and process tanks, valve trenches, and sewers are particularly susceptible to high concentrations of H₂S and may require atmospheric testing, communications equipment, and standby emergency rescue personnel.

OSHA regulates confined spaces in the Permit-Required Confined Spaces Standard (29 CFR 1910.146).¹⁷ Further information on this standard is provided in the references section of this bulletin.

¹⁷ <http://www.osha.gov/SLTC/confinedspaces/>.

Handle and store NaHS safely

The hazards associated with NaHS require employers to establish facility-specific safe handling and storage practices and procedures for both employees and contractors. These practices and procedures include:

- Controlling access and supervising product delivery and transfer.
- Installing local exhaust ventilation on process or storage equipment where personnel exposure is likely and ensuring that such systems are operating properly before starting a process.
- Installing fixed H₂S monitors with alarms in NaHS storage and offloading areas where concentrations could exceed safe levels.
- Providing PPE and emergency eyewash and shower facilities where there is a risk of exposure to NaHS.
- Ensuring that NaHS-containing wastes are not flushed to acid-containing sewers without controls to prevent a release of H₂S.
- Storing NaHS separately from low pH (acidic) materials to avoid inadvertent mixing.
- Clearly labeling NaHS containers, process piping, and critical process piping valves that may contain NaHS with essential hazard information.

- Warning against exposure of NaHS to excessive heat or storage near open flames or other ignition sources that might generate or ignite flammable H₂S.
- Ensuring that storage containers and process equipment materials are compatible with the alkalinity of NaHS. Manufacturers of NaHS warn against using copper, zinc, or aluminum.
- Implementing an emergency notification system to inform emergency responders and potentially impacted offsite residents of threatening incidents.

Emergency Response

Emergency responders must immediately take precautions in the case of a fire or spill involving NaHS. If there is evidence of an H₂S release — either the presence of its characteristic rotten egg odor or affirmative H₂S monitoring results — emergency responders should:

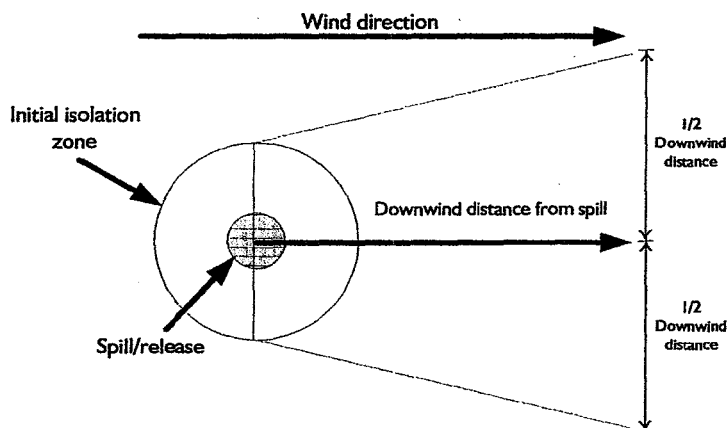
- **Restrict access to the spill/release site:** Allow only emergency personnel equipped with proper PPE to enter the area (i.e., NIOSH-approved, full face-piece SCBA in pressure demand mode, and protective outer garments).
- **Decide whether to evacuate or shelter-in-place:** This decision is made under urgent conditions. Factors that must be considered include population distribution,

risk of exposure, adequacy of available shelters, evacuation time requirements, and other factors such as the characteristics of the chemical released and weather conditions. This issue has been studied thoroughly by researchers at the Oak Ridge National Laboratory, as documented in *Planning Protective Action Decision-Making: Evacuate or Shelter-in-Place?* (USDOE, 2002; <http://www.osti.gov/bridge/>).

A decision to evacuate should be based on the reasonable assurance that movement is in the best interest of those being evacuated:

- ♦ **Evacuation:** Downwind of a release — before starting to move upwind — unprotected personnel should move directly crosswind to one-half of the downwind distance from the spill. The crosswind distance varies in relation to the size of the spill and downwind distance. See Figure 5 and Table 4 for the initial isolation and protective action distances recommended by the DOT Emergency Response Guidebook (2004; <http://hazmat.dot.gov/guidebook.htm>).

• Figure 5. Initial isolation and evacuation diagram.



- ♦ **Shelter-in-place:** This is a precaution to keep people safe while remaining indoors. It calls for taking refuge in a preferably small, interior room with no or few windows; closing windows and doors; turning off heating and air-conditioning systems; and listening to local TV/radio for emergency response directions.

Offsite residents or plant personnel who may be required to shelter-in-place must be provided with instructions and training, and must have necessary supplies on hand (e.g., food, water, tape, vinyl sheeting) prior to an incident. Detailed

information regarding shelter-in-place is available at <http://www.cdc.gov/> and <http://www.redcross.org/>.

- **Conduct continuous downwind monitoring:** Determine if H_2S concentrations exceed the AIHA ERPGs¹⁸ (ERPG-3 or -2 values from Table 5) or the OSHA PEL; and continue to evacuate or shelter-in-place as required.

Firefighting

Contact between NaHS and an acid—or exposure to excessive heat—liberates H_2S , which presents an inhalation and fire

¹⁸ NAS has developed acute exposure guideline levels that may be more protective than AIHA ERPGs. Interim exposure levels for H_2S are available at <http://www.epa.gov/oppt/aegl/>.

Table 4
 H_2S Initial Isolation
and Protective Action
Distances

Small Spill (a)

1. Isolate spill area **100 feet** in all directions
2. Protect persons downwind
Day (b) – 0.1 mile (528 feet)
Night – 0.2 mile (1,056 feet)

Large Spill (c)

1. Isolate spill area **700 feet** in all directions
2. Protect persons downwind
Day (b) – 1.3 miles (6,864 feet)
Night – 3.9 miles (20,592 feet)

(a) From a small package (55 gallons or smaller) or from a small leak from a large package.

(b) Sunrise to sunset.

(c) From a large package or from many small packages.

Source: USDOT, 2004.

Table 5
H₂S Emergency Response
Planning Guidelines

	60-Minute Concentration (ppm)
ERPG-3 (a)	100
ERPG-2 (b)	30
ERPG-1 (c)	0.1

(a) ERPG-3 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.

(b) ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their ability to take protective action.

(c) ERPG-1 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.

Source: AIHA, 2004.

hazard. In addition, burning H₂S produces sulfur dioxide (SO₂), which is a severe respiratory irritant that can be life threatening. If a fire involves NaHS, the DOT Emergency Response Guidebook (2000) recommends the following:¹⁹

- Small fires:
 - ◆ Use dry chemicals, CO₂, or water spray.²⁰
- Large fires:
 - ◆ Use dry chemicals, CO₂, alcohol-resistant foam, or water spray.
 - ◆ Move containers of NaHS from fire area if possible to do so without risk.
 - ◆ Contain contaminated fire control water for later disposal.
- Fires involving a tank, railcar, or tank truck:
 - ◆ Fight the fire from the maximum distance possible, or use unmanned hose holders or monitor nozzles.
 - ◆ Do NOT allow water to enter containers of NaHS.

¹⁹ See Guide 154 for NaHS solutions.

²⁰ Some manufacturers and fire safety professionals caution against using extinguishers containing CO₂ and dry chemical extinguishing media because they form acids when mixed with water and may exacerbate the generation of H₂S when used on fires involving NaHS. They recommend using water in flooding quantities to fight the actual fire, and water spray or foam to control vapors. If CO₂ or dry chemical extinguishers are used, responders must wear proper respiratory protection (i.e., SCBA).

- ◆ Cool containers with flooding amounts of water until well after the fire is extinguished.
- ◆ Withdraw immediately in case of a rising sound from venting safety devices or discoloration of the tank.
- ◆ ALWAYS stay away from burning tanks.

Spill Response

In the event of a NaHS spill:

- Do NOT allow NaHS to come in contact with acids.
- Contain the spill. Do NOT flush to a sewer unless the sewer is designed and engineered to control the H₂S that may be released.
- Remove sources of ignition so that any H₂S released will not ignite.
- Provide maximum ventilation.
- Recover spilled material on adsorbents, such as sand or vermiculite, and place in covered containers for reclamation or disposal.
- For spills that exceed the 5,000-pound reporting threshold,²¹

²¹ NaHS is listed in Table 302.4 of the Superfund, Emergency Planning and Community Right-to-Know Act (40 CFR 302) as a hazardous substance with a reportable quantity of 5,000 pounds, based on 100 percent purity (approximately 1,077 gallons of 43 percent solution). See <http://www.epa.gov/swercepp/factsheets/epcra.pdf> for more information.

notify NRC at 1-800-424-8802 or <http://www.nrc.uscg.mil>.²²

Emergency Responders

Emergency responders must wear NIOSH-approved, full face-piece SCBA in pressure-demand or positive-pressure mode and chemical-resistant outer garments when there is a threat of airborne concentrations of H₂S exceeding the PEL. To avoid endangering emergency responders, NaHS- or H₂S-contaminated outerwear should be discarded and victims decontaminated prior to placing them in a confined space, such as a medical transport vehicle.

Emergency rescue

If H₂S is present, do NOT attempt to rescue a fallen worker without proper PPE.

First Aid

Each year a large number of fatalities result from failed rescue attempts by those who rush into dangerous environments to help fallen workers. *First responders and emergency medical personnel must protect themselves before rendering aid to others.*

²² This is a regulatory threshold reporting quantity established by EPA with an emphasis on identifying adverse environmental impact. Spills and releases of much smaller quantities of NaHS can lead to catastrophic consequences. For example, the spillage of about 100 gallons of NaHS led to the Georgia-Pacific incident, reviewed on page 13.

Emergency responders responsible for facilities that handle NaHS should familiarize themselves with the ATSDR *Medical Management Guidelines for H₂S* (2003; <http://www.atsdr.cdc.gov/MHMI/mmg114.html>). Do NOT enter an unknown or potentially hazardous environment without ensuring that it is safe by sampling the air and/or wearing proper PPE.²³

Inhalation of H₂S

Move the victim into fresh air and administer oxygen as necessary.²⁴ Victims of overexposure to H₂S (or NaHS vapors that may contain H₂S) should immediately receive emergency medical attention.

Eye Contact

In the event of eye contact with either NaHS or high concentrations of H₂S, immediately irrigate the eyes with copious amounts of water for at least 20 minutes, or until the arrival of emergency medical personnel. An ophthalmologic examination should be conducted as soon as possible because the extent of some injuries related to corrosive eye exposure may not be apparent for 48 to 72 hours.

²³ Eight contractor employees were injured during the Georgia-Pacific incident when they remained in the zone of danger to assist with the rescue of fallen workers.

²⁴ In some states, administering oxygen requires emergency medical certification.

Chemical shower and eyewash facilities must meet the requirements outlined in the OSHA Medical Services and First Aid Standard (29 CFR 1910.151(c)).²⁵ Applying elements of the Emergency Eyewash and Shower Equipment Standard, ANSI Z358.1-2004, fulfills OSHA requirements and provides adequate protection to workers.²⁶

Skin Contact

Immediately remove contaminated clothes and irrigate exposed skin with copious amounts of water for at least 15 minutes, regardless of symptoms. A physician may need to examine the exposed area if irritation or pain persists or worsens.

Ingestion

Do NOT induce vomiting or attempt to neutralize ingested NaHS. Immediately request emergency medical assistance by calling 911 and the national Poison Control Center emergency hotline at 1-800-222-1222.

²⁵ http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9806.

²⁶ ANSI Z358.1-2004 is available for purchase at <http://webstore.ansi.org/ansidocstore/default.asp>.

Selected Case Studies

Georgia-Pacific, Naheola pulp and paper mill, Pennington, Alabama (2 killed, 8 injured)

On January 16, 2002, two workers were killed and eight injured while performing maintenance near a NaHS transfer terminal. NaHS had recently been pumped from 15 tanker trucks into storage tanks. Because of a leaking pump, NaHS accumulated in a spill containment pit that was connected to the plant acid sewer.

When the containment pit was drained, a relatively small quantity of NaHS²⁷ reacted with acid in the sewer to produce H₂S. The H₂S leaked through a faulty manway cover seal into the area where the contractors were working.

The CSB investigation concluded that Georgia-Pacific management was unaware that the containment pit drained to the acid sewer. However, neither Georgia-Pacific nor the previous plant owners had adequately evaluated the potential for hazardous chemical mixing in the sewer system and the release of deadly amounts of H₂S. Consequently, plant personnel, contract workers, and emergency responders were unaware of and unprepared for the dangers.

²⁷ CSB investigators estimated that 100 gallons of NaHS was allowed to accumulate in the pit.

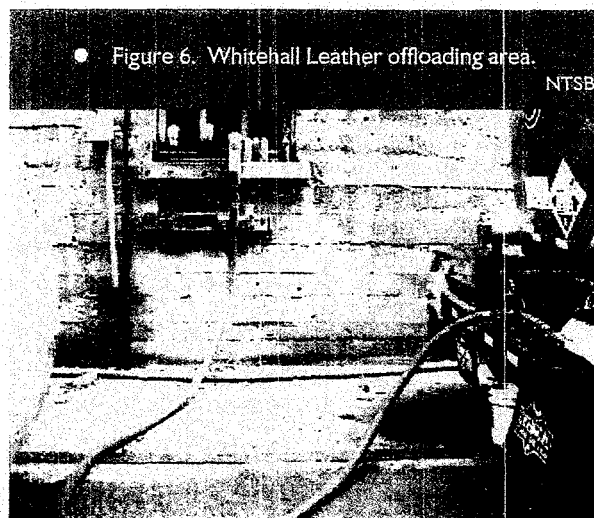
Whitehall Leather Company, Whitehall, Michigan (1 killed, 1 injured)

On June 4, 1999, the driver of a tanker truck filled with NaHS inadvertently pumped the tanker contents into a storage tank partially filled with "pickle acid" (hydrochloric acid). The tanker truck had arrived at the plant during the night shift.

The shift supervisor—never having received a shipment of NaHS and believing it to be pickle acid—directed the driver to unload it into a pickle acid storage tank (Figure 6). The resulting reaction released H₂S, which killed the driver and injured a plant employee.

Powell Duffryn terminal fire, Savannah, Georgia (337 medical evaluations, community evacuation)

On April 10, 1995, the force from an explosion in a solvent storage tank fractured NaHS transfer piping. Up to 300,000 gallons of NaHS spilled and mixed with a similarly large quantity of acidic cleaning solution (Figure 7). The NaHS and



● Figure 6. Whitehall Leather offloading area.

acid solution tanks were colocated inside an earthen containment.

The reaction released an enormous volume of H₂S, which caused 337 people to seek medical evaluations and forced 2,000 downwind residents to evacuate. The evacuation lasted more than 30 days as H₂S continued to evolve from NaHS-saturated soil.

This incident illustrates the failure of management systems to identify and evaluate the hazards associated with colocating incompatible materials inside a single spill containment. The EPA investigation report (1998) is available at <http://yosemite.epa.gov/opa/admpress.nsf/0/8e314f057b62e118852565fe006fa986?OpenDocument>.

● Figure 7. Powell Duffryn fire.

EPA



Stone Savannah River pulp and paper mill, Wentworth, Georgia (1 killed, 4 injured)

On December 8, 1990, one worker was killed and four injured when a large quantity of H_2S formed during acid cleaning of a 20,000-gallon pulping solution pressure filter. H_2S was routinely produced inside the process vessel when the cleaning solution was used to dissolve $NaHS$ -containing pulping filtrate. Local exhaust ventilation normally controlled the H_2S .

However, on the day of this incident, H_2S leaked from the system and accumulated inside the walled containment where workers were operating valves. According to witnesses, the workers immediately smelled H_2S and tried to escape, but were overwhelmed before being able to climb out of the valve pit.

Westvaco paper mill, Covington, Virginia (10 injured)

On May 4, 1988, 10 employees were hospitalized for H_2S exposure when a 300,000-gallon storage tank containing pulping solution collapsed (Figure 8). The plant sewer system routinely controlled storm runoff, spills, and discharged wastes.

However, when the $NaHS$ -containing pulping solution entered the sewer, it reacted with waste acids and produced H_2S —which escaped via drains, vents, and manways. The 10 injured employees were working at various locations near the vents and manways.

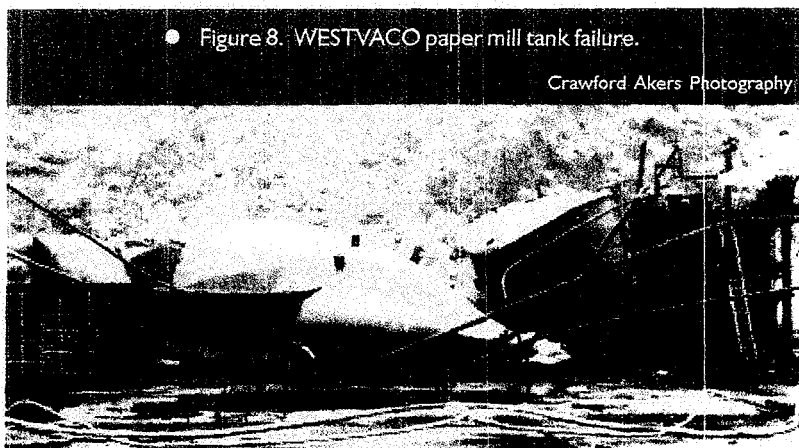
Horween Leather Company, Chicago, Illinois (8 killed, 43 injured)

On February 14, 1978, eight workers were killed, 43 were injured, and 57 sought medical evaluation after being overwhelmed by H_2S . The incident began when a substitute delivery driver unloaded a tanker truck of $NaHS$ into a storage tank containing an acid. He was unfamiliar with plant operations and $NaHS$ hazards, and was unsupervised by plant personnel.

A large volume of H_2S was immediately generated, which led to evacuation of the entire plant and surrounding community. Although the tank fill line coupling

● Figure 8. WESTVACO paper mill tank failure.

Crawford Akers Photography



was designed to prevent inadvertent mixing, the driver created a makeshift coupling when he was unable to attach the line from the truck.

**Prime Tanning Company,
Berwick, Maine (6 killed)**

On April 2, 1971, six workers died when NaHS was inadvertently pumped into a tank containing acidic chrome tanning liquor, which has a pH of 3 to 4. The NaHS delivery drivers had been instructed where to offload their tanker truck.

When the drivers discovered that the truck's fill nozzle would not fit the tank's coupler, they used an adapter nozzle. There was no labeling on the tank to identify its contents or to warn of the potential hazard. Approximately 160 gallons of NaHS had been transferred to the tank before one of the drivers noticed that workers inside the plant were collapsing. NaHS had mixed with the chrome liquor to produce H_2S .

References and Additional Information

AIHA, 2004. *ERPG/WEEL Handbook*.

ANSI/ASSE, 2003. *Safety Requirements for Confined Spaces*, Z117.1-2003 (<http://webstore.ansi.org/ansidocstore/default.asp>).

ANSI/ASSE, 1998. *Emergency Eyewash and Shower Equipment*, Z358.1-1998.

ANSI/ASSE, 1995. *Safety Requirements for H_2S Training Criteria*, Z390.1-1995.

ATSDR, 2003. *Medical Management Guidelines for Hydrogen Sulfide Gas*, August 2003 (<http://www.atsdr.cdc.gov/MHMI/mmg114.html>).

ATSDR, 1999. *Toxicological Profile for Hydrogen Sulfide*.

Bretherick, Leslie, P. G. Urben, and Martin J. Pitt, 1999. *Bretherick's Handbook of Reactive Chemical Hazards*, Sixth Edition, Vol. 1, Butterworth-Heinemann.

CCPS, 2003. *Essential Practices for Managing Chemical Reactive Hazards*, AIChE (<http://www.aiche.org>).

CCPS, 1996. *Inherently Safer Chemical Processes, A Life Cycle Approach*, AIChE.

CCPS, 1994. *Guidelines for Preventing Human Error in Process Safety*, AIChE.

CCPS, 1992. *Guidelines for Hazard Evaluation Procedures*, AIChE.

CCPS, 1989. *Guidelines for Technical Management of Chemical Process Safety*, AIChE.

Health and Safety Executive (HSE), 2000. *Designing and Operating Safe Chemical Reaction Processes*, Norwich, U.K.: HSE Books.

McManus, Neil, 1999. *Safety and Health in Confined Spaces*, Lewis Publishers/CRC Press.

NFPA, 1975. *Hazardous Chemical Data*, NFPA 49.

NIOSH, 2003. *Recommendations for Chemical Protective Clothing, A Companion to the NIOSH Pocket Guide to Chemical Hazards*, Table H, August 2003 (<http://www.cdc.gov/niosh/npg/npg.html>).

NLM Hazardous Substance Data Base (<http://toxnet.nlm.nih.gov/index.html>).

OSHA, 1993. Selected occupational fatalities related to pulp, paper and paperboard mills as found in OSHA fatality/catastrophe investigations, June 1993 (<http://www.osha.gov>).

Rekus, John F., 1994. *Complete Confined Spaces Handbook*, Lewis Publishers/CRC Press.

Sayers, Robert H., 1979. "Safety in Handling and Using Sulfide, Sulphydrate, and Other Hazardous Chemicals in a Tannery," *Journal of American Leather Chemists Association*, Vol. 74, pp. 64-69.

Shih, Thomas, et al., 1967. "Hydrogen Sulfide Vapor - Liquid Equilibrium in Aqueous Systems as a Function of Temperature and pH," *TAPPI Journal*, Vol. 50, No. 12, pp. 630-634, December 1967.

The Innovation Group, 2003. *Chemical Profiles* (<http://www.the-innovation-group.com>).

USCG, 2001. *Chemical Hazards Response Information System (CHRIS)*; <http://www.chrismanual.com>.

USCSB, 2003. *Investigation Report, Hydrogen Sulfide Poisoning, Georgia-Pacific Naheola Mill, Pennington, Alabama, January 16, 2002*, Report No. 2002-01-I-AL, January 2003 (<http://www.csb.gov>).

USCSB, 2002. *Hazard Investigation, Improving Reactive Hazard Management*, Report No. 2001-01-H, December 2002

USDOE/Oak Ridge National Laboratory, 2002. *Planning Protective Action Decision-Making: Evacuate or Shelter-in-Place?* ORNL/TM-2002-144, prepared for Federal Emergency Management Agency (<http://www.otsi.gov/bridge/>).

USDOT, 2004. *North American Emergency Response Guidebook*, J. J. Keller and Associates (<http://hazmat.dot.gov/guidebook.htm>).

USEPA, 1998. *EPA Chemical Accident Investigation Report, Powell Duffryn Terminals, Inc., Savannah, Georgia*, Office of Solid Waste and Emergency Response, EPA 550-R-98-003, May 1998 (<http://yosemite.epa.gov/opa/admpress.nsf/0/8e314f057b62e118852565fe006fa986?OpenDocument>).

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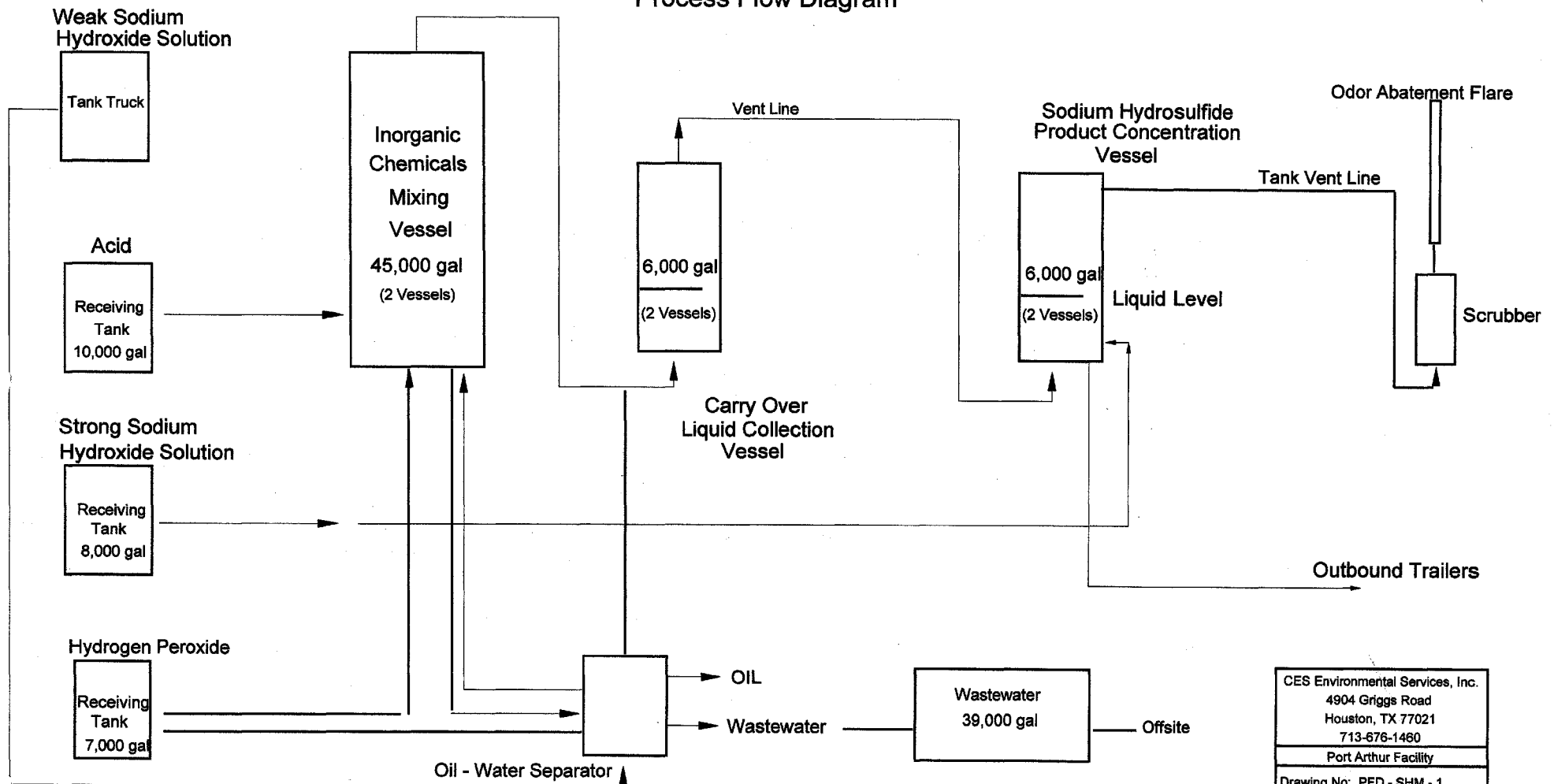
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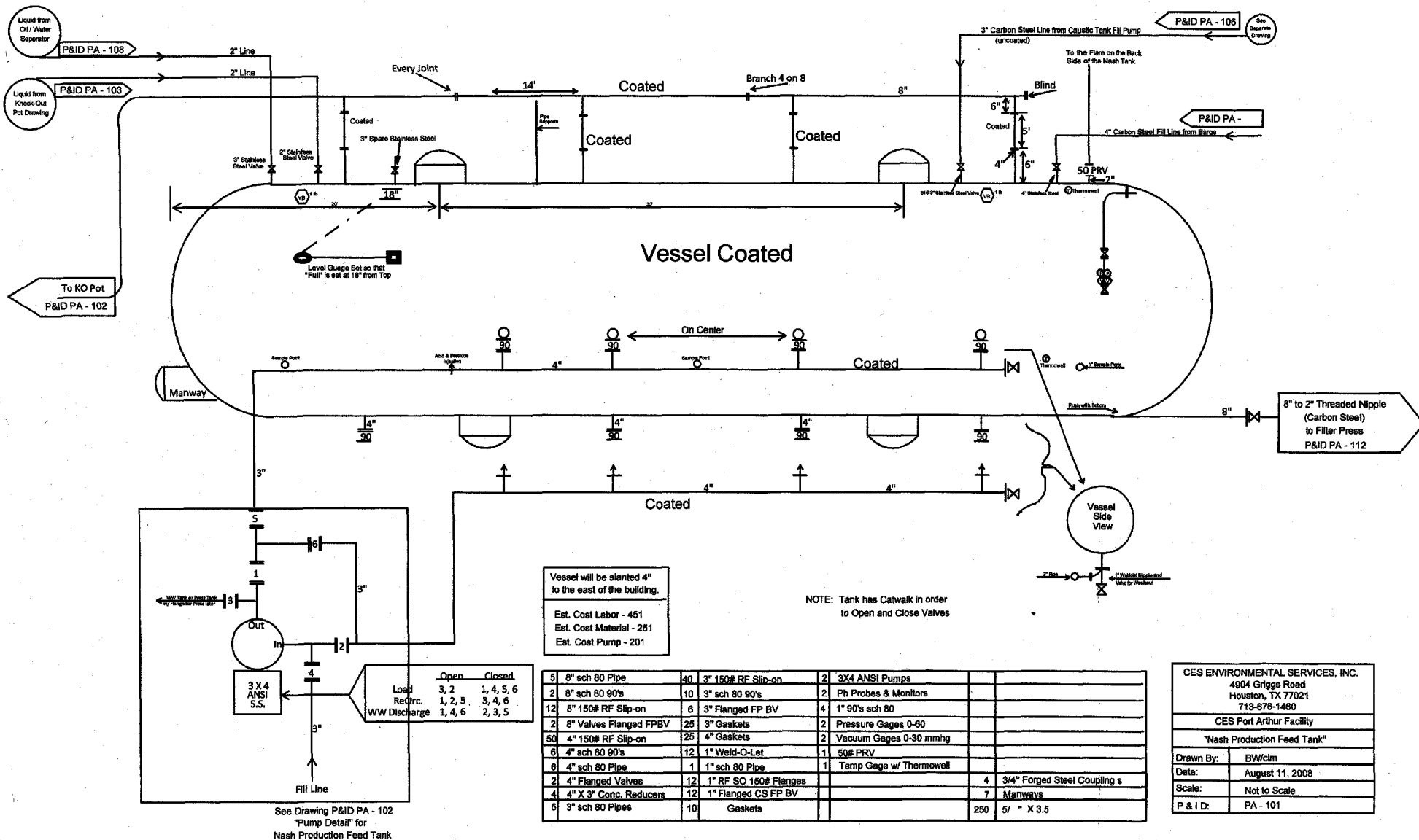
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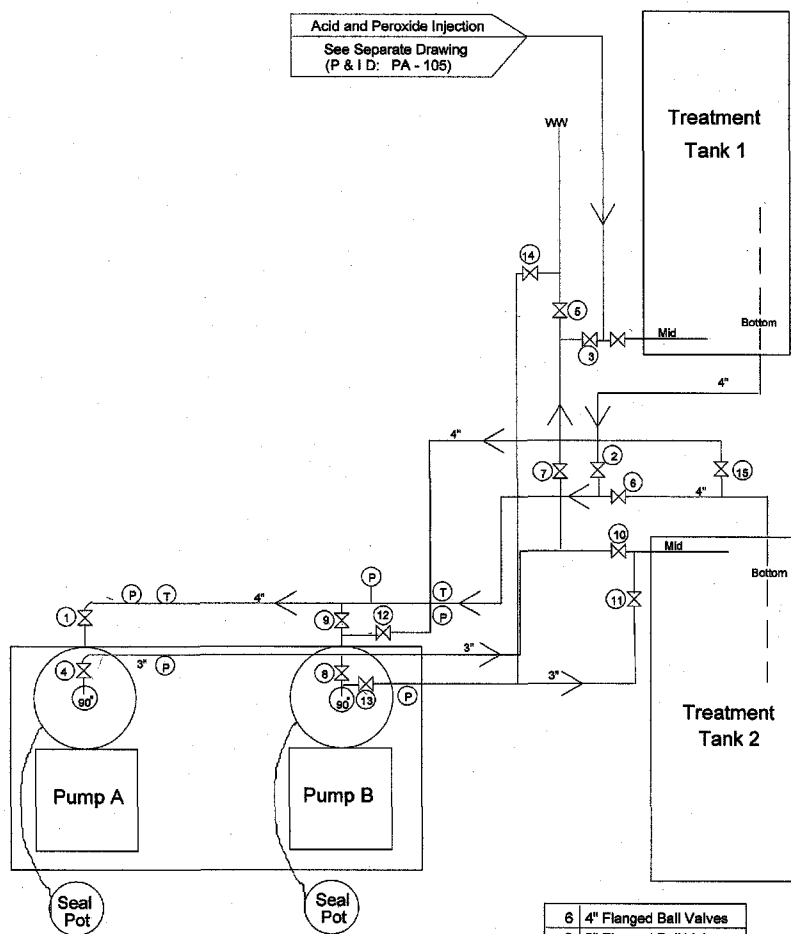
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<http://www.ntis.gov/support/cooperat.htm>

CES Port Arthur Inorganic Chemical Production Operation Process Flow Diagram



CES Environmental Services, Inc.
4904 Griggs Road
Houston, TX 77021
713-676-1460
Port Arthur Facility
Drawing No: PFD - SHM - 1
Drawn By: CGH/clm
Date: July 28, 2008





6	4" Flanged Ball Valves
9	3" Flanged Ball Valves
20	4" Flanges
26	3" Flanges
25	4" 90 deg Sch 80
25	3" 90 deg Sch 80
8	4" Tees Sch 80
8	3" Tees Sch 80
20	4" Gaskets
20	3" Gaskets

Pump A

Treatment Tank 1

Circulate - Open 1, 2, 3, 4, 7

Discharge - Open 1, 2, 4, 5, 7

Treatment Tank 2

Circulate - Open 1, 4, 6, 10

Discharge - Open 1, 4, 5, 6, 7

Pump B

Treatment Tank 1

Circulate - Open 2, 3, 7, 8, 9

Discharge - Open 2, 5, 7, 8, 9

Treatment Tank 2

Circulate - Open 6, 8, 9, 10

Discharge - Open 5, 6, 7, 8, 9

Run Both Systems Simultaneously

Pump A - Treatment Tank 1

Circulate - Open 1, 2, 3, 4, 7

Discharge - Open 1, 2, 4, 5, 7

Pump B - Treatment Tank 2

Circulate - Open 11, 12, 13, 15

Discharge - Open 12, 13, 14, 15

DO NOT DISCHARGE BOTH TANKS AT THE SAME TIME

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Houston, TX 77021
713-676-1460

CES Port Arthur Facility

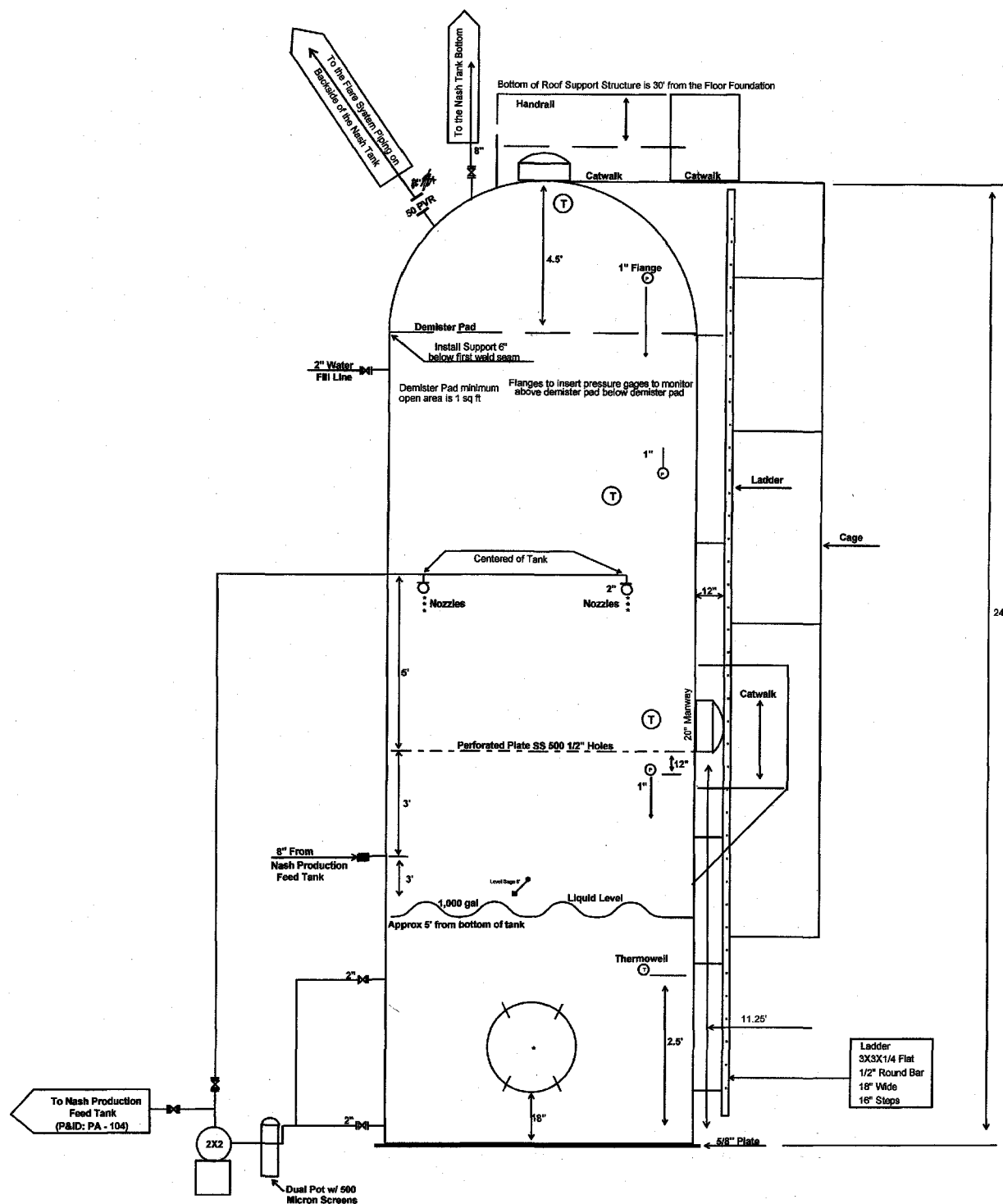
"Pump A & B Treatment Tanks for
Nash Production Feed Tank"

Drawn By: BW/dm

Date: August 7, 2008

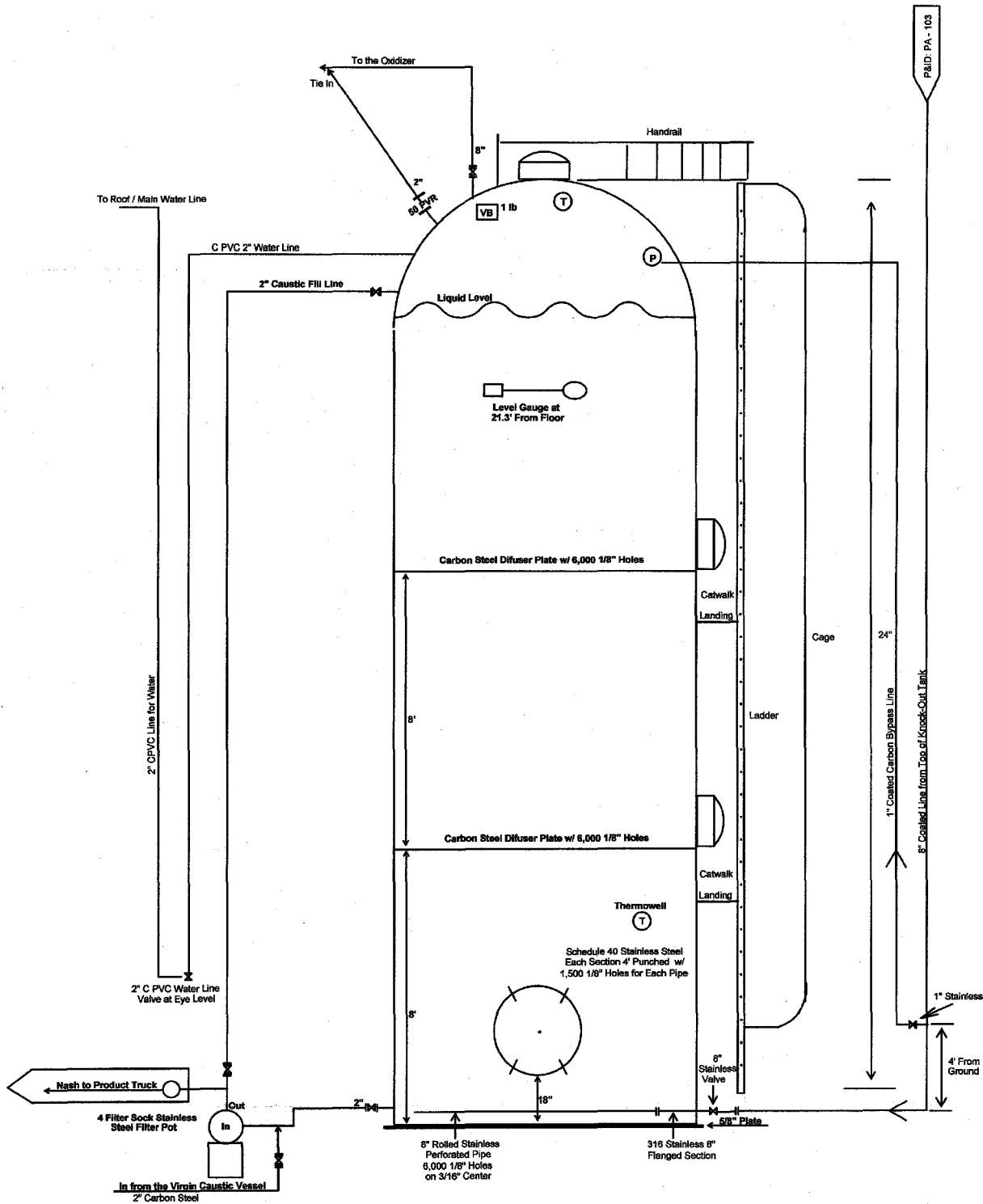
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P & I D: PA - 102



1	6X6X5/8" Plate	1	8" Sch 80 Tee	1	Magnetic Level Gage
2	2" Sch 80 Pipe	10	2" Gaskets	1	2X2 Pump
3	2" RF Slip-on Flanges	4	3X14 Strap	1	Demister Pad
4	2" Flanged Ballvalves CS FP	2	1/2" Round Stock	1	Temp Gage / Thermowell
5	2" 90's SW	6	2X2X3/16 >	1	Perf Plate w/ 500 1/2" Holes
6	1" 150# RF Slip-on	1	3/16X1X3' Grating	1	50# PRV
7	1" Sch 80 Pipe (Press Gage)	6	2X3/16 Strap	3	Pressure Gases 0-50
8	1" SW 90's			3	Manways
9	2" Tees SW	4	8" 150# RF Slip-ons	64	5/8X3.5" Studs; 128 Nuts
10	8" Flanged BV CS	2	8" Ball Valves Flanged Full Port		
11	8" Sch 80 Pipe				
12	8" Sch 80 90's				

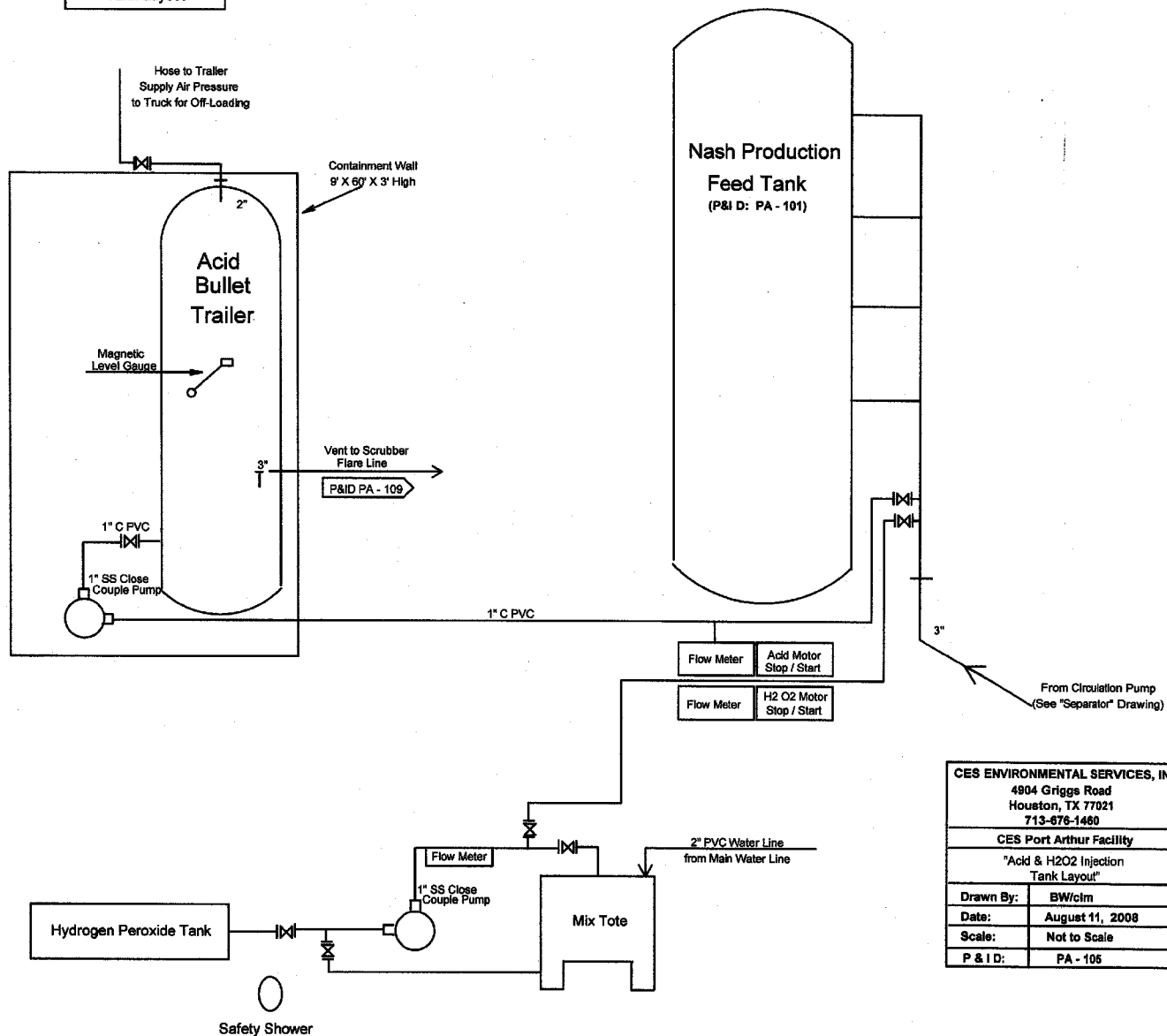
CES ENVIRONMENTAL SERVICES, INC.	
4904 Griggs Road	
Houston, TX 77021	
713-676-1460	
CES Port Arthur Facility	
"Knock Out Tank"	
Drawn By:	BW/ilm
Date:	August 7, 2008
Scale:	Not to Scale
P & I D:	PA - 103



PAID: PA - 103

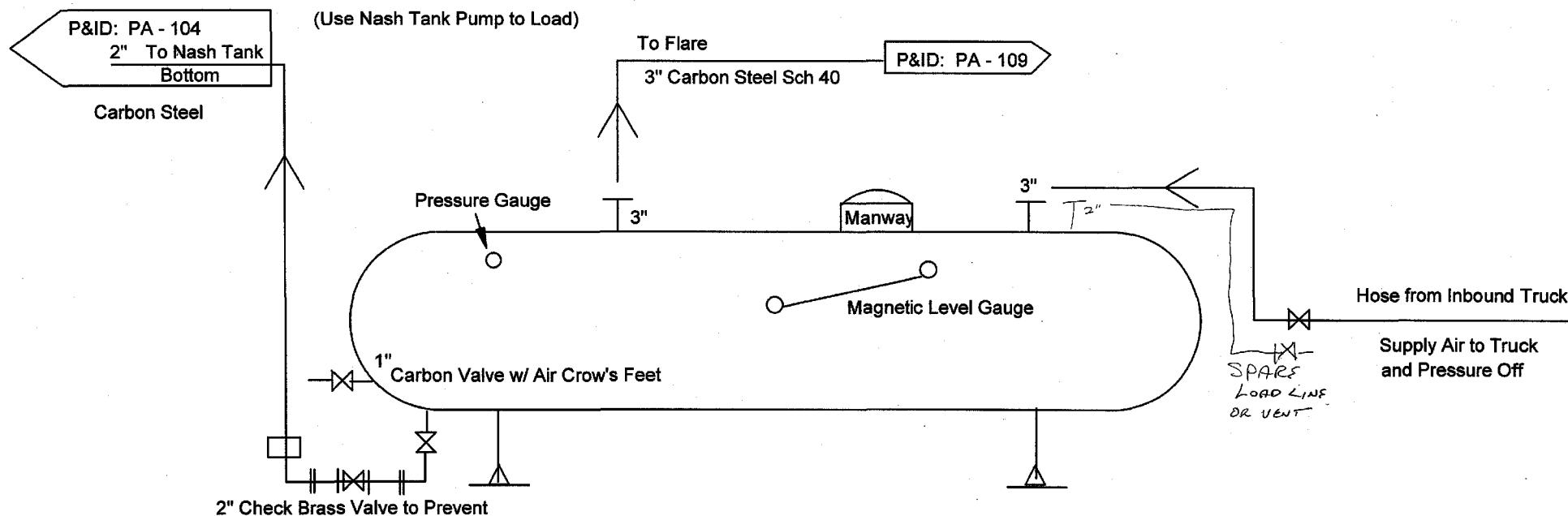
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4904 Griggs Road	
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713-676-1468	
CES Port Arthur Facility	
"Nash Tank"	
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Scale:	Not to Scale
P & I D:	PA - 104

Acid & H2O2 Injection
Tank Layout

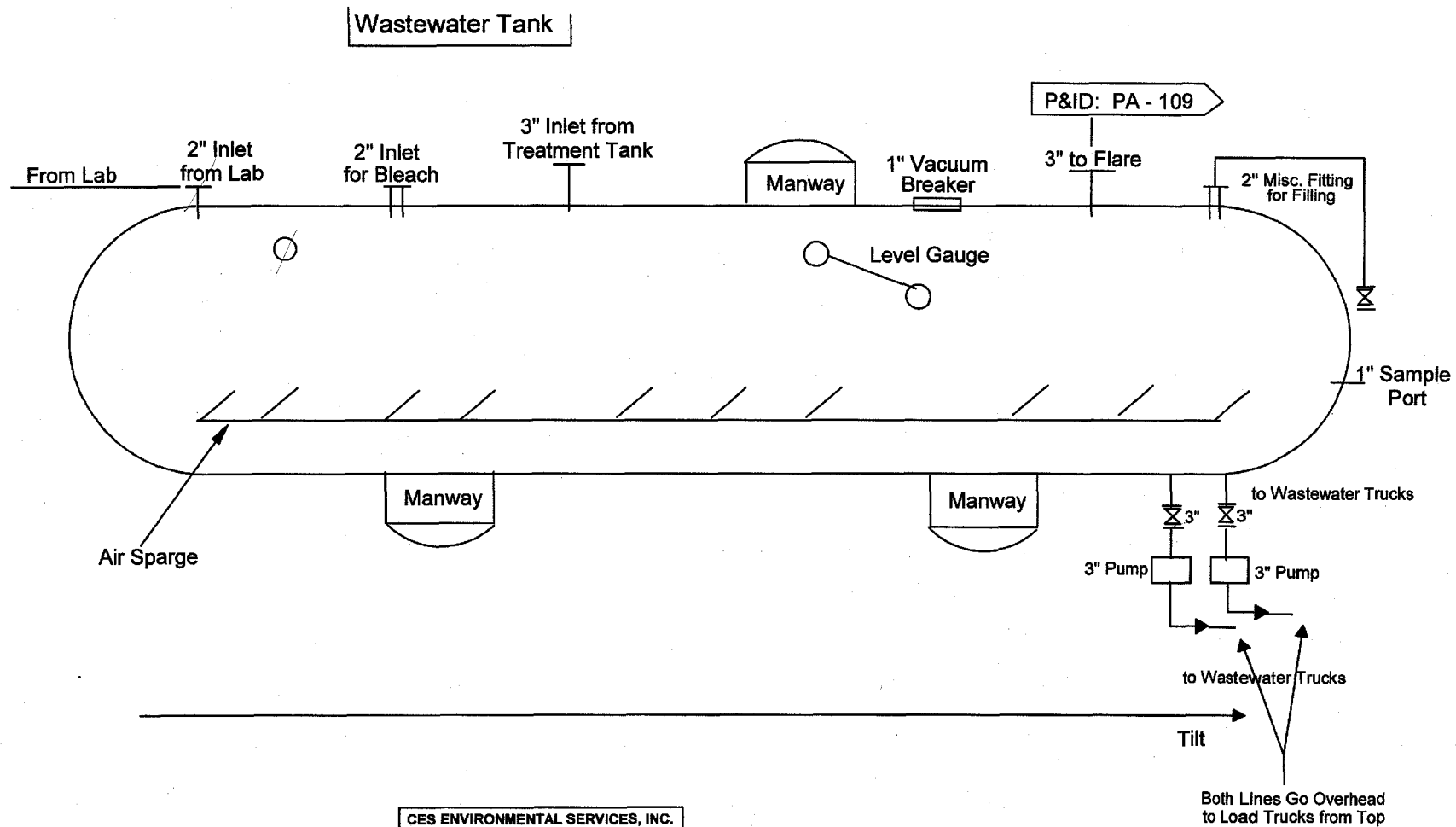


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713-676-1460	
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"Acid & H2O2 Injection Tank Layout"	
Drawn By:	BW/cim
Date:	August 11, 2008
Scale:	Not to Scale
P & I D:	PA - 105

Fresh Caustic Supply Tank

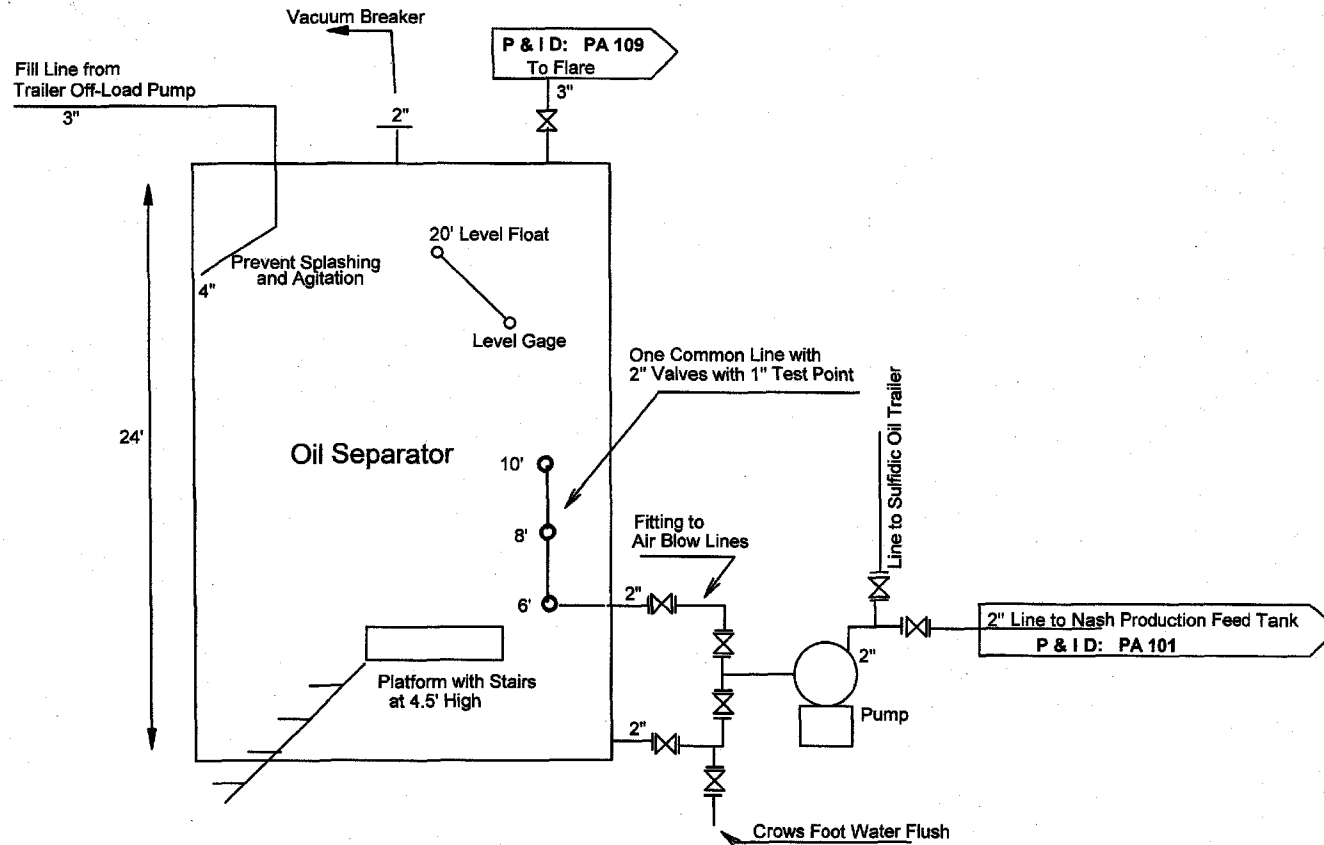


CES ENVIRONMENTAL SERVICES, INC. 4904 Griggs Road Houston, TX 77021 713-676-1460	
CES Port Arthur Facility	
"Fresh Caustic Supply Tank"	
Drawn By:	MB/clm
Date:	August 11, 2008
Scale:	Not to Scale
P & I D:	PA - 106



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Houston, TX 77021	
713-676-1460	
CES Port Arthur Facility	
"Wastewater Tank"	
Drawn By:	MB/clm
Date:	August 11, 2008
Scale:	Not to Scale
P & I D:	PA - 107

Sulfidic Oil / Caustic Separator



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4904 Griggs Road
Houston, TX 77021
713-676-1460

CES Port Arthur Facility

"Sulfidic Oil / Caustic Separator"

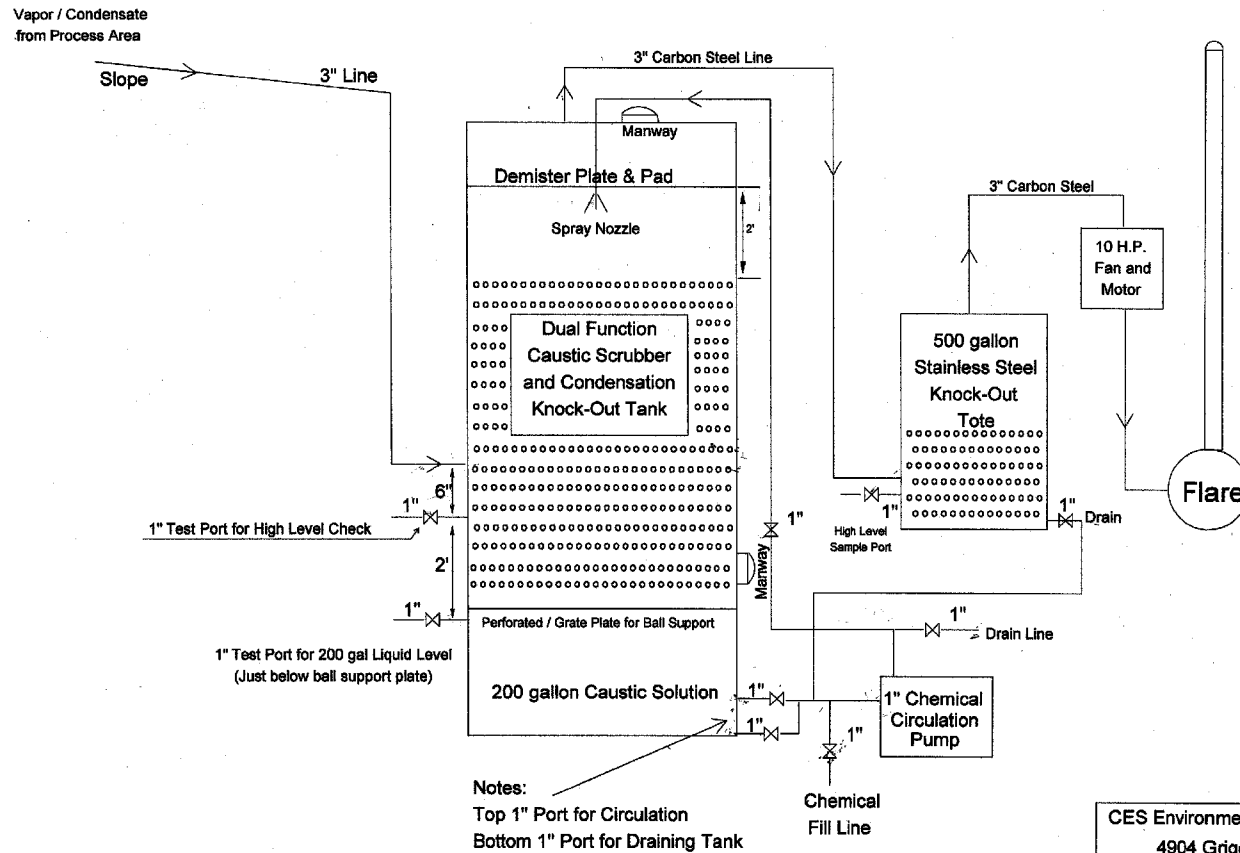
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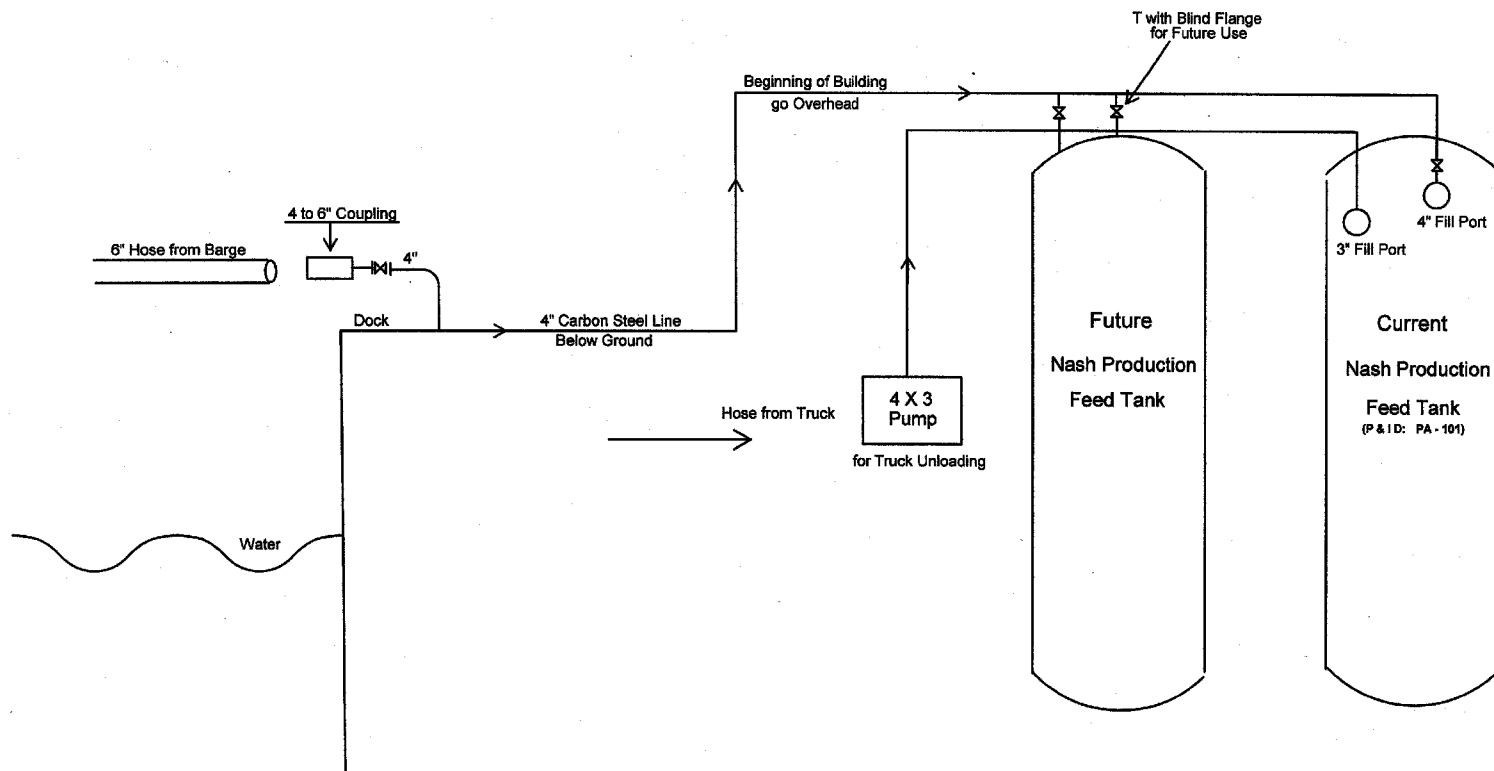
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Vapor Lines, Scrubber, Flare Systems

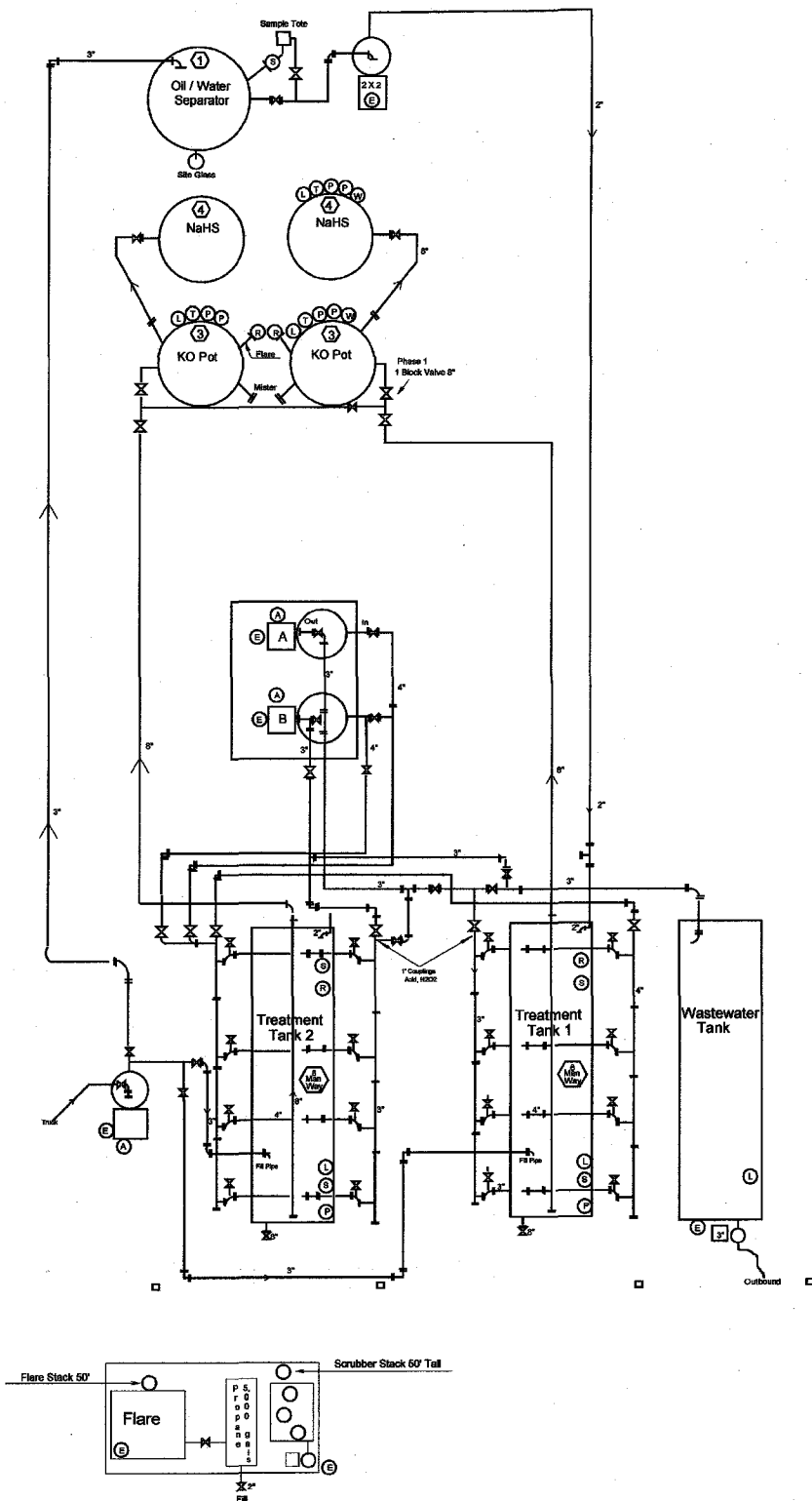


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713-676-1460	
CES Port Arthur Facility	
"Scrubber Flare System"	
Drawn By:	CGH/clm
Date:	August 7, 2008
Scale:	Not to scale
P & I D:	PA - 109

Truck and Barge Caustic Receiving

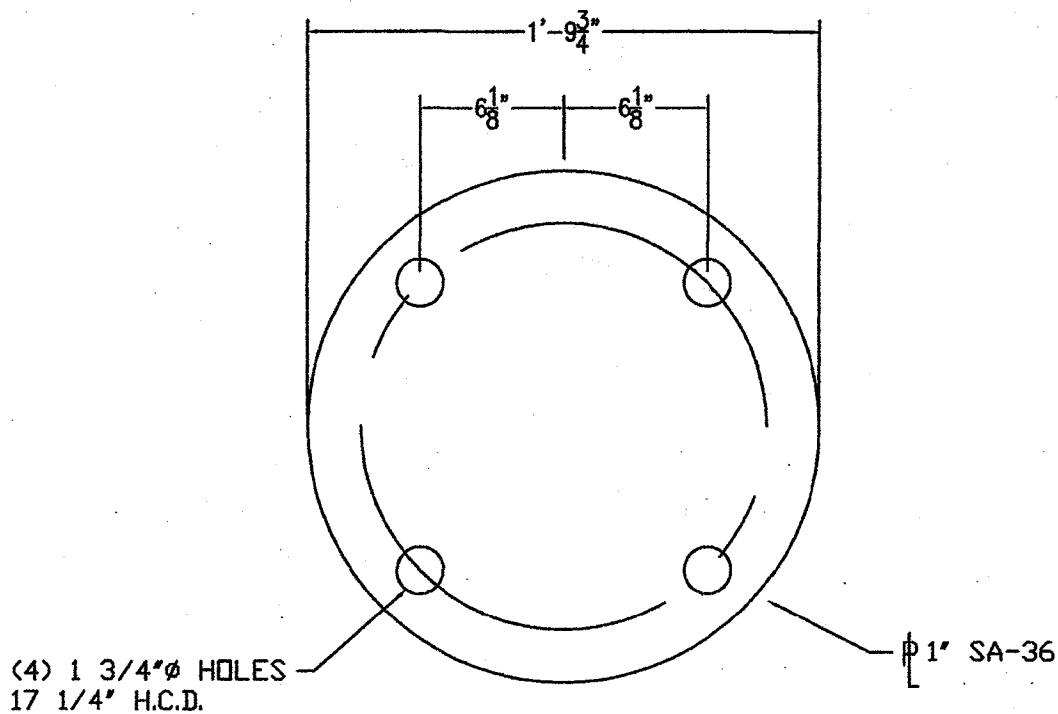


CES ENVIRONMENTAL SERVICES, INC.	
4804 Griggs Road	
Houston, TX 77021	
713-678-1480	
CES Port Arthur Facility	
"Truck and Barge Caustic Receiving"	
Drawn By:	BW/clm
Date:	August 7, 2008
Scale:	Not to Scale
P & I D:	PA - 110

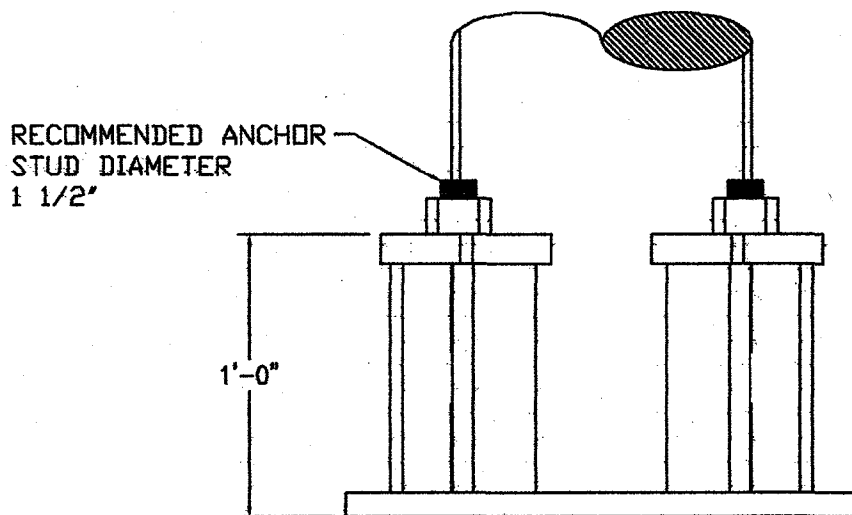


- (E) Electrical Point
- (S) 1" Flanged Sample Port w/ Valve
- (P) 1" Flanged Pressure / Vacuum Gauge
- (A) Plant Air
- (L) Level Gauge
- (M) Manways
- (R) 50 # Pressure Relief Valve
- (W) Water

CES Environmental Services, Inc. 4904 Griggs Road Houston, TX 77021 713-678-1460	
CES Port Arthur Facility	
Treatment Tanks 1 & 2 Wastewater Tank	
Drawn By:	BW/cim
Date:	August 8, 2008
Scale:	Not to Scale
P & I D:	PA-111



BASE PLATE DETAIL
PLAN VIEW



BASE PLATE DETAIL
ELEVATION VIEW



Tornado Technologies Inc.
Alletyon, Texas 78935
1-888-732-2400

CUSTOMER:

CES ENVIRONMENTAL

3" x 40'-0" TALL
AIR ASSIST FLARE
BASE PLATE DETAIL

P.O. No.

375306

JOB SITE

PORT ARTHUR, TX

DATE:

7/30/08

SCALE:

1 1/2"=1'-0"

CHECKED:

GK

APPROVED:

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written consent.

REVISION No.

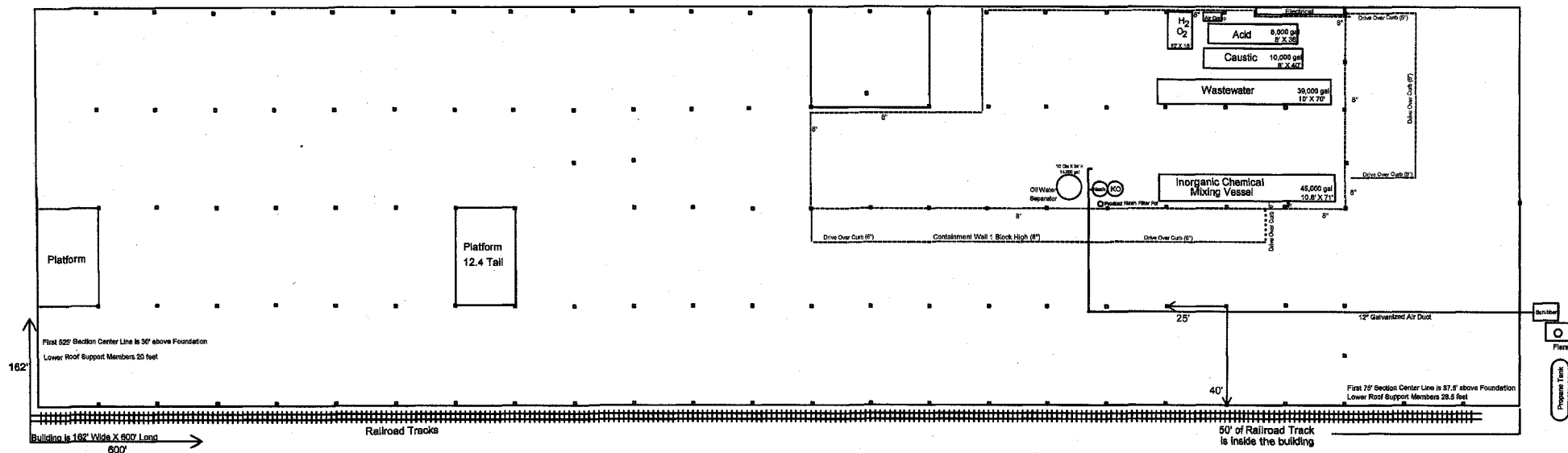


DRAWING No.

9262-PARTS



Red is a Containment Wall 1 Block High (8")



KMTEX
Tank Farm

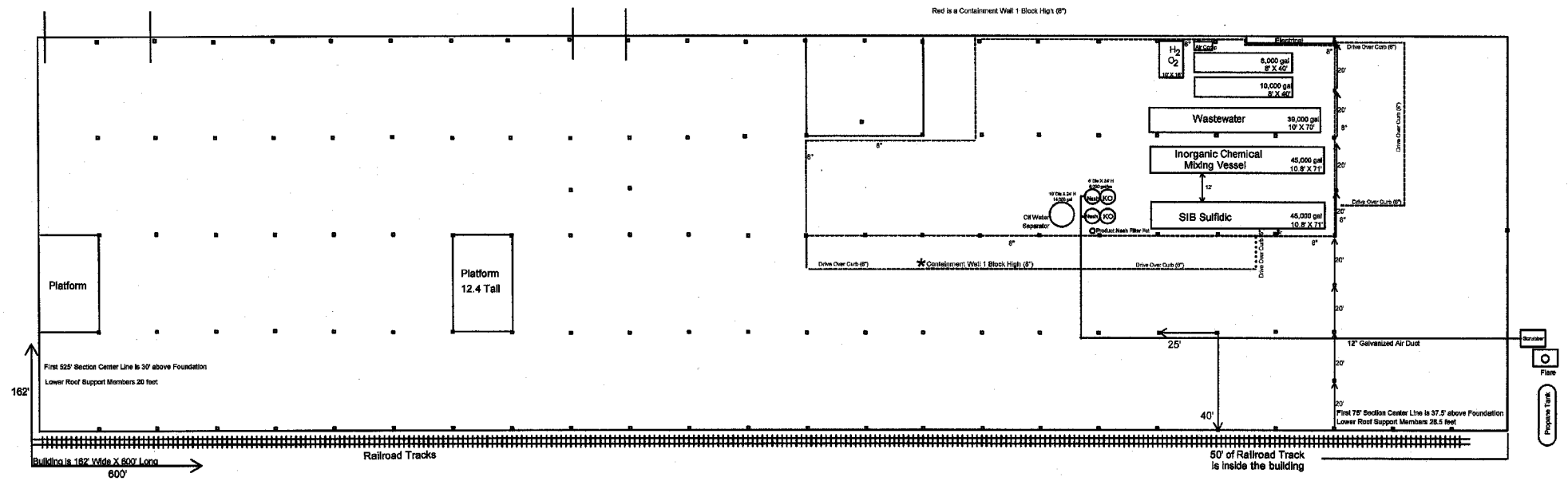
CES ENVIRONMENTAL SERVICES, INC.	
CES Port Arthur Site	
"Inorganic Chemical Mixing Operation"	
Drawn By: BW/om	Date: July 28, 2008
Revision No.: 11	1in = 40 ft



CES ENVIRONMENTAL SERVICES, INC.	
CES Port Arthur Site	
"Warehouse Plan View" (Whole Process)	
Drawn By: BW/cm	Date: August 11, 2008
Revision No.: 11	Scale: 1" = 40'

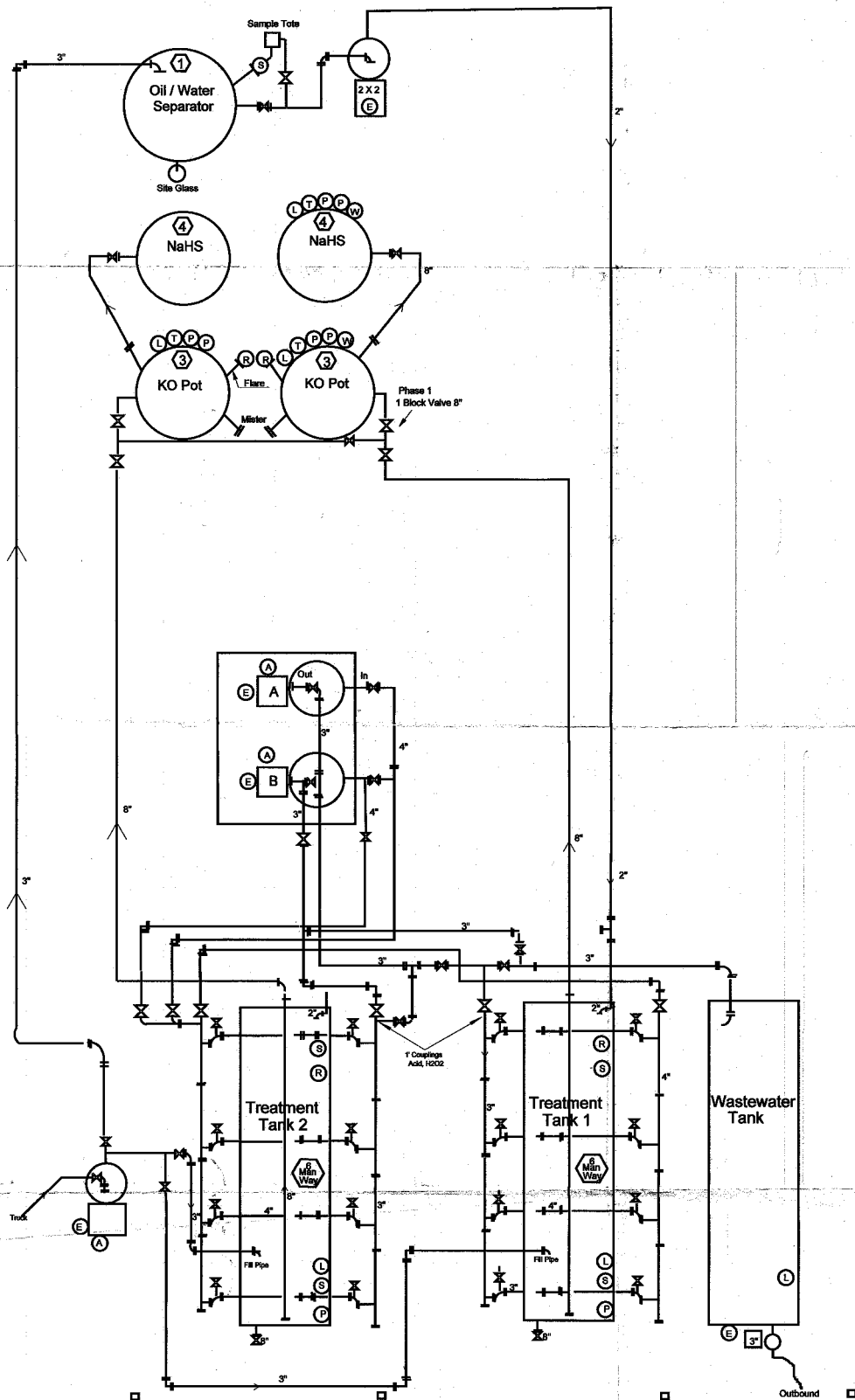


Red is a Containment Wall 1 Block High (8')



KMTEX
Tank Farm

CES ENVIRONMENTAL SERVICES, INC.	
CES Port Arthur Site	
"Warehouse Plan View"	
Drawn By: BW/om	Date: July 28, 2008
Revision No.: 11	Scale: 1" = 40'

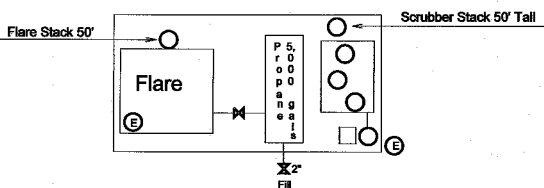


- (E) Electrical Point
- (S) 1" Flanged Sample Port w/ Valve
- (P) 1" Flanged Pressure / Vacuum Gauge
- (A) Plant Air
- (L) Level Gage
- (T) Manways
- (R) 50 # Pressure Relief Valve
- (W) Water

Fence Line

Talen
Marine
(nearest
receptor)

CES Environmental Services, Inc. 4904 Griggs Road Houston, TX 77021 713-676-1460	
CES Port Arthur Facility	
Treatment Tanks 1 & 2 Wastewater Tank	
Drawn By:	BW/clm
Date:	August 8, 2008
Scale:	Not to Scale
P & I D:	PA-111



H



▼

CES ENVIRONMENTAL SERVICES, INC.	
CES Port Arthur Site	
"Warehouse Plan View" (Whole Process)	
Drawn By: BW/cmc	Date: August 11, 2008
Revision No.: 11	Scale: 1" = 40'

EPAPPA004002851

Afton Product MSDS

.....

Hite
Additives

SAP# 16909

2982

Material Safety Data Sheet

**1. Chemical product and company identification**

Product name DURASYN ® 164 POLYALPHAOLEFINS
MSDS # 0000000781
Code 0000000781 (NAP)
Product use Industrial applications: Synthetic Base Material
Supplier Innovene USA LLC
200 E. Randolph Drive
Chicago, IL 60606
Emergency phone: 1 (800) 424-9300
Outside the US: +1 703-527-3887 (CHEMTREC)

OTHER PRODUCT INFORMATION 1 (888) 260-6737 Toll free - North America
email:MSDS@innovene.com

2. Composition/information on ingredients

Ingredient name	CAS #	% by weight
1-decene, homopolymer, hydrogenated	68037-01-4	>99

3. Hazards identification

Physical state Liquid.
Color Colorless.
Emergency overview

This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.

Routes of entry Dermal contact. Eye contact. Inhalation. Ingestion.

Potential health effects

Eyes No significant health hazards identified.
Skin Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis.
Inhalation Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion No significant health hazards identified.

Medical conditions aggravated by over-exposure None identified.

See toxicological information (section 11)

4. First aid measures

Eye contact In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin contact Wash exposed skin with soap and water. Get medical attention if irritation develops.
Inhalation If inhaled, remove to fresh air. Get medical attention if symptoms appear.
Ingestion Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Product name	DURASYN ® 164 POLYALPHAOLEFINS	MSDS #	0000000781 (NAP)	Page: 1/5
Version 1	Date of issue 04/26/2006.	Format	US-COMP	Language ENGLISH.
		Build 4.2.7		(ENGLISH)

EPAPA005000003

5. Fire-fighting measures

Flammability of the product	May be combustible at high temperature.
Auto-ignition temperature	685 °C
Flash point	224 °C (Closed cup) Pensky-Martens.
Products of combustion	These products are carbon oxides (CO, CO ₂) (carbon monoxide, carbon dioxide)
Unusual fire/explosion hazards	This material is not explosive as defined by established regulatory criteria.
Fire-fighting media and instructions	In case of fire, use water fog, foam, dry chemicals, or carbon dioxide.
Protective clothing (fire)	Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

6. Accidental release measures

Personal precautions	Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (See Section: "Exposure controls/personal protection"). Follow all fire fighting procedures (See Section: "Fire-fighting measures").
Environmental precautions and clean-up methods	If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways. See Section 13 for Waste Disposal Information.
Personal protection in case of a large spill	Splash goggles. Full suit. If heated and ventilation is inadequate, use respirator which will protect against organic vapor. Boots. Gloves.

7. Handling and storage

Handling	Avoid prolonged or repeated contact with skin. Avoid breathing vapor or mist. Wash thoroughly after handling.
Storage	Keep container tightly closed. Keep container in a cool, well-ventilated area. Empty containers may contain harmful, flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld, reuse or dispose of containers unless adequate precautions are taken against these hazards.

8. Exposure controls/personal protection

Occupational exposure limits

Ingredient name	Occupational exposure limits
1-decene, homopolymer, hydrogenated	None assigned.

Control Measures Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.

Hygiene measures Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Personal protection

Eyes	Chemical splash goggles.
Skin and body	Avoid prolonged or repeated contact with skin. Wear protective clothing if prolonged or repeated contact is likely.
Respiratory	Use with adequate ventilation. If ventilation is inadequate, use certified respirator that will protect against organic vapor.
Hands	Wear protective gloves if prolonged or repeated contact is likely. (Nitrile gloves.)

The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Product name	DURASYN ® 164 POLYALPHAOLEFINS	MSDS #	0000000781 (NAP)	Page: 2/5
Version	1	Date of Issue	04/26/2006.	Format US-COMP
				Language ENGLISH.
				(ENGLISH)
				Build 4.2.7

Consult your supervisor or S.O.P. for special handling directions

Consult local authorities for acceptable exposure limits.

9. Physical and chemical properties

Physical state	Liquid.
Odor	Odorless.
Color	Colorless.
Heat of combustion	Not available.
Boiling point / Range	346 °C
Pour Point	<= -85°F (<= -65°C)
Specific gravity	0.82
Vapor pressure	<0.133 kPa (<1 mm Hg)
Solubility	negligible, < 0.1%
Viscosity	Kinematic: 17 mm²/s (17 cSt) at 40°C

10. Stability and reactivity

Stability and reactivity	The product is stable.
Conditions to avoid	Keep away from heat and direct sunlight. Avoid inhalation of vapors and spray mist.
Incompatibility with various substances	Strong oxidizing materials
Hazardous decomposition products	carbon oxides (CO, CO ₂) (carbon monoxide, carbon dioxide)
Hazardous polymerization	Will not occur.

11. Toxicological information

Ingredient name	Test	Result	Route	Species
DURASYN® 164 POLYALPHAOLEFINS	LD50	>5000 mg/kg	Oral	Rat

Chronic toxicity

Carcinogenic effects	No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH or the International Agency for Research on Cancer (IARC). No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).
Mutagenic effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a mutagen.
Reproductive effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a reproductive toxin.
Teratogenic effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as teratogenic or embryotoxic.

12. Ecological information

Ecotoxicity	No testing has been performed by the manufacturer.
Mobility	This product is not likely to move rapidly with surface or groundwater flows because of its low water solubility. This product is not likely to volatilize rapidly into the air because of its low vapor pressure.

Product name	DURASYN® 164 POLYALPHAOLEFINS	MSDS #	0000000781 (NAP)	Page: 3/5
Version 1	Date of Issue 04/26/2006.	Format	US-COMP	Language ENGLISH.
		Build 4.2.7		(ENGLISH)

13. Disposal considerations

Waste information Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Dispose of in accordance with all applicable local and national regulations.

Consult your local or regional authorities.

14. Transport information

Not classified as hazardous for transport (DOT, TDG, IMO/IMDG, IATA/ICAO)

15. Regulatory information

U.S. Federal regulations US INVENTORY (TSCA): Listed on inventory.

This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

This product does not contain any hazardous ingredients at or above regulated thresholds.

SARA 313

Form R - Reporting requirements This product does not contain any hazardous ingredients at or above regulated thresholds.

Supplier notification This product does not contain any hazardous ingredients at or above regulated thresholds.

State regulations CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4):: This material is not regulated under CERCLA Sections 103 and 107.

Pennsylvania RTK:(not a special hazard)

California Prop 65: No products were found

Inventories AUSTRALIAN INVENTORY (AICS): Listed on inventory.

CANADA INVENTORY (DSL): Listed on inventory.

CHINA INVENTORY (IECS): Listed on inventory.

EC INVENTORY (EINECS/ELINCS): In compliance.

JAPAN INVENTORY (ENCS): In compliance.

KOREA INVENTORY (ECL): Listed on inventory.

PHILIPPINE INVENTORY (PICCS): Listed on inventory.

16. Other Information

Label requirements

This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.

HMIS® Rating :

Health	0	National Fire Protection Association (U.S.A.)
Flammability	1	
Physical	0	
Hazard Personal protection	X	



History

Date of issue 04/26/2006.

Date of previous issue No Previous Validation.

Prepared by Product Stewardship

Notice to reader

Product name	DURASYN ® 164 POLYALPHAOLEFINS	MSDS #	0000000781 (NAP)	Page: 4/5
Version	1	Date of issue	04/26/2006.	Format US-COMP
				Language ENGLISH.
				(ENGLISH)
		Build 4.2.7		

NOTICE : *This Material Safety Data Sheet is based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We are not responsible for any damage or injury resulting from abnormal use, from any failure to follow appropriate practices or from hazards inherent in the nature of the product.*

Product name		MSDS #	Page: 5/5
DURASYN ® 164 POLYALPHAOLEFINS		0000000781 (NAP)	
Version 1	Date of issue 04/26/2006.	Format US-COMP	Language ENGLISH.
		Build 4.2.7	(ENGLISH)



ETHANOX 323

2941
**Material
Safety Data Sheet**

MSDS No. E323

(b) (4)

(b) (4)



(b) (4)



(b) (4)



(b) (4)



*** END OF MSDS ***



Material Safety Data Sheet

Stock 1221

MSDS no.

Stock 1221

1. Product and company identification

Product use Petrochemical industry: Dispersant

Date of issue/Revisions 21 August 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : Not regulated.

Symbol :

Signal word :

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	10 - 19.9	Not classified.	No.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : Wash with soap and water. Get medical attention if irritation develops.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazardous decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Flash point : Closed cup: 150°C (302°F) [Pensky-Martens. Minimum]
Open cup: 218°C (424.4°F) [Cleveland.]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Wash thoroughly after handling.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal protective equipment

Respiratory system : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).

Skin and body : Disposable outer garments when there is a risk of contact with the material.

Hands : Use chemical-resistant, impervious gloves.

Eyes : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
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1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	(Canada). TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).
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9. Physical and chemical properties

Physical state and Appearance	: Liquid. [Viscous liquid.]
Color	: Brown. [Dark]
Odor	: Ammoniacal.
Density	: 0.922 g/cm ³ at 15°C
Specific gravity	: 0.922 at 15.6°C (target).
Solubility	: Insoluble in the following materials: cold water.
Viscosity	: 31022 cSt at 40°C 570 cSt at 100°C (target).
Auto-ignition temperature	: Not determined.
Flash point	: Closed cup: 150°C (302°F) [Pensky-Martens. Minimum] Open cup: 218°C (424.4°F) [Cleveland.]

10. Stability and reactivity

Stability	: The product is stable.
Materials to avoid	: Strong oxidizing and reducing agents.
Conditions to avoid	: High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry	: Skin, Eyes, Ingestion, and Inhalation.
Target organs	: None known.
Acute effects	
Inhalation	: Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion	: Not determined.
Skin contact	: Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact	: Non-irritating to the eyes.
Adverse effects	: Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Stock 1221	LD50 Dermal	Rabbit	>10000 mg/kg	-
	LD50 Oral	Rat	39400 mg/kg	-

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental fate : This product contains components which may be persistent in the environment.
 Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.
 European waste catalogue (EWC) Number : 13-02-05

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to EU legislation.
 Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States (TSCA) : All components are listed or exempted.

Canada : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan (ENCS) : All components are listed or exempted.
Australia (NICNAS) : All components are listed or exempted.
Korea (ECL) : All components are listed or exempted.
China (IECSC) : All components are listed or exempted.
Philippines (PICCS) : All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 8/21/2008.



Date of printing : 8/26/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

In the United States and Canada:
Afton Chemical Corporation
500 Spring Street
Richmond, Virginia
USA 23219-2183
Telephone number: 804-788-5800

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***

SAP# 14516, 15654

2982



Material Safety Data Sheet

NFPA	HMS (U.S.A.)	Rating	Protective Clothing	DOT (pictograms)
	Health Hazard (1) Fire Hazard (1) Reactivity (0) Personal Protection (B)	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme		Not evaluated for transport Non évalué pour le transport

Section I: Chemical Product and Company Identification

Product Name	PARAFLEX HT OILS	Code	490-348, PHT3 490-364, PHT4 490-349, PHT5
Synonym	Paraflex HT 3, 4, 5	DSL	See Section 15
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	TSCA	See Section 15
Material Uses	Paraflex HT oils are process oils used as a diluent or carrier in the production of a variety of finished industrial products.	In case of Emergency	Petro-Canada: 403-298-3000 Canuck Transportation: 613-996-8686 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section II: Composition and Information on Ingredients

Name	CAS #	% (V/V)	Exposure Limits (ACGIH)		
			TLV-TWA(8h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	The base oil may be a mixture of the following CAS#s: 8042-47-5, 84742-46-7, 84742-52-5, 84742-54-7, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1, 178603-64-0 178603-65-1 178603-66-2 445411-73-4	-	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section III: Hazards Identification

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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Section IV: First Aid Measures

Eye Contact	No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed. If irritation persists, obtain medical advice.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with water and non-abrasive soap for 5 minutes or until chemical is removed. Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts, etc.). If irritation persists, repeat flushing. Obtain medical advice immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.

PARAFLEX HT OILS		Page Number: 2
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT induce vomiting because of danger of aspirating liquid into lungs. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention.	
Note to Physician	Not available	

Section V: Fire Fighting Measures			
Flammability	May be combustible at high temperature.		Flammable Limits Not available
Flash Points	OPEN CUP: (Cleveland.) PHT3: $\geq 120^{\circ}\text{C}$ ($\geq 248^{\circ}\text{F}$) PHT4: $\geq 120^{\circ}\text{C}$ ($\geq 248^{\circ}\text{F}$) PHT5: $\geq 140^{\circ}\text{C}$ ($\geq 284^{\circ}\text{F}$) CLOSED CUP: (Pensky-Martens.) PHT3: 124°C (255.2°F) PHT4: 134°C (273.2°F) PHT5: 143°C (289.4°F)		Auto-Ignition Temperature Fire Point PHT5: 159°C (318.2°F)
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.		Explosion Hazards Do not cut, weld, heat, drill or pressurize in Presence of empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG2004, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section VI: Accidental Release Measures	
Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Ensure clean-up personnel wear appropriate personal protective equipment. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.

Section VII: Handling and Storage	
Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

Section VIII: Exposure Controls/Personal Protection	
Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	- The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)

PARAFLEX HT OILS		Page Number: 4
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.	
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.	
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.	
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.	
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.	
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as Group 1, 2A, or 2B carcinogens by IARC.	
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.	
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.	
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.	
Other Considerations	No additional remark.	

Section XII: Ecological Information			
Environmental Fate	Not available	Persistence/ Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks No additional remark.			

Section XIII: Disposal Considerations	
Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section XIV: Transport Information			
DOT Classification	Not a hazardous material for transport according to the requirements of the DOT. (United States)	Special Provisions for Transport	Not applicable.

Section XV: Regulatory Information			
Other Regulations	<p>This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).</p> <p>All components of this formulation are listed on the US EPA-TSCA Inventory.</p> <p>All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).</p> <p>This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.</p> <p>Please contact Product Safety for more information.</p>		
DSD/DPD (EEC)	Xn- Harmful R65- Harmful: may cause lung damage if swallowed. S62- If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.	WHMIS (Canada) Not controlled	
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN	TDG (Canada) (Pictograms)	

PARAFLEX HT OILS

Page Number: 5

Section XV, Other Information**References**

Available upon request.

* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
 ADR - Agreement on Dangerous goods by Road (Europe)
 ASTM - American Society for Testing and Materials
 BOD5 - Biological Oxygen Demand in 5 days
 CAN/CGA B149.2 Propane Installation Code
 CAS - Chemical Abstract Services
 CEPA - Canadian Environmental Protection Act
 CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
 CFR - Code of Federal Regulations
 CHIP - Chemicals Hazard Information and Packaging Approved Supply List
 CNS - Central Nervous System
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCG - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - European Economic Community/European Union
 EINECS - European Inventory of Existing Commercial Chemical Substances
 EPA - Environmental Protection Agency
 EPCRA - Emergency Planning and Community Right to Know Act
 FDA - Food and Drug Administration
 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazard Communication Standard
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer
 IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant Release Inventory
 NSNR - New Substances Notification Regulations (Canada)
 NTP - National Toxicology Program
 OSHA - Occupational Safety & Health Administration
 PEL - Permissible Exposure Limit
 RCRA - Resource Conservation and Recovery Act
 RTECS - Registry of Toxic Effects of Chemical Substances
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance Limit
 TLV-TWA - Threshold Limit Value-Time Weighted Average
 TSCA - Toxic Substances Control Act
 USEPA - United States Environmental Protection Agency
 USP - United States Pharmacopoeia
 WHMIS - Workplace Hazardous Material Information System

For Copy of MSDSInternet: www.petro-canada.ca/msds**Lubricants:**

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564
 Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285
 Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 11/2/2005.

Data entry by Product Safety - DSR.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

PARAFLEX HT OILS

Page Number: 3

Respiratory A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume or mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. A NIOSH-approved positive-pressure, air-supplied respirator or self-contained breathing apparatus may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

Hands If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): neoprene, nitrile, polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Feet Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section IX: Physical and Chemical Properties

Physical State and Appearance	Viscous liquid.	Viscosity	PHT3: 3.0 - 4.0 cSt @ 40°C, 1.31 cSt @ 100°C. PHT4: 3.0 - 4.0 cSt @ 40°C, 1.31 cSt @ 100°C. PHT5: 4.5 - 6.0 cSt @ 40°C, 1.71 cSt @ 100°C.
Colour	Clear and bright	Pour Point	PHT3: <21°C (-6°F) PHT4: <51°C (-60°F) PHT5: <9°C (16°F)
Odour	Mild petroleum oil like.	Softening Point	Not applicable
Odour Threshold	Not available	Dropping Point	Not applicable
Boiling Point	Not available	Penetration	Not applicable
Density	0.815 to 0.87 kg/L @ 15°C (59°F).	Oil / Water Dist. Coeff.	Not available
Vapour Density	Not available	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Not available	Solubility	Insoluble in water.

Section X: Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids	Decomposition Products	May release COx, smoke and irritating vapours when heated to decomposition.



Section XI: Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	Acute toxicity information is not available for the product as a whole, therefore, data for the base oils are provided below: Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >2500 mg/m ³ /4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.
Inhalation Route:	With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.

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Material Safety Data Sheet

NFPA	HCS Risk Phrases	Personal Protective Equipment
	HCS CLASS: Irritating substance.	

Section 1 Chemical Product and Company Identification		
Common Name/ Trade Name	Sul-Perm 10 E Lubricant Additive	
Manufacturer	Ferro Corporation Petroleum Additives 3000 Sheffield Avenue Hammond, IN 46327-1099	Emergency Phone Numbers CHEMTREC: 1-800-424-9300
Chemical Name	Sulfurized Fatty Oil.	24 Hour Information Number: 1-216-641-5324
Synonym	Sulfurized Fatty Oil	
CAS#	Proprietary	Plant Number-Week Days Only: 1-219-931-2630
Code	Not available.	

Section 2 Composition and Information on Ingredients			
Ingredients	CAS #	% Weight	TLV/PEL
Sulfurized Fatty Oils			Not applicable.

Section 3 Hazards Identification	
Emergency Overview CAUTION!	A non-flammable, dark brown-black, high viscosity liquid. Hydrogen sulfide gas may be present in the headspace of the product container. Combustion can produce carbon and sulfur oxides, and hydrogen sulfide. Exposure to intense heat may cause drums to rupture. Treat as an oil fire.
Potential Chronic Health Effects	There is no known effect from chronic exposure to this product. Repeated or prolonged exposure is not known to aggravate medical condition. See Section 11.
Potential Acute Health Effects	May cause moderate eye irritation.

Section 4 First Aid Measures	
Eye Contact	Avoid contact with eyes. Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention.
Skin Contact	Avoid contact with skin and eyes. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. If irritation persists, seek medical attention.
Inhalation	Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	No known effect according to our data base. If ingested, seek medical advice immediately and show the container or the label.

Section 5 Fire and Explosion Data	
Flammability of the Product	Non-flammable. Auto-Ignition Temperature Not available.
Flash Points	OPEN CUP: >176.67°C (350°F). (Cleveland).
Flammable Limits	Not available.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet. Use self contained breathing apparatus equipt with full face piece operated in a positive pressure mode and full protective clothing. Treat as oil fire. Water may be used to keep containers cool.
Products of Combustion	Carbon oxides (CO, CO2), sulfur oxides (SO2, SO3...), hydrogen sulfide, and products of incomplete combustion.
Fire Hazards in Presence of Various Substances	No specific information is available in our database regarding the flammability of this product in presence of various materials.
Special Remarks on Fire Hazards	Some hydrogen sulfide gas is evolved at room temperature. Large amounts of hydrogen sulfide gas, and other sulfur containing gases can be evolved at elevated temperatures.

Section 6 Accidental Release Measures

Small Spill	Absorb with an inert material and place in an appropriate waste disposal container.
Large Spill	Treat like an oil spill. Containment booms can be used. Recover product if possible. Wear appropriate protective equipment. Stop spill at the source. Dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid can be taken up with absorbent material and placed into containers. Non-flammable material.

Section 7 Handling and Storage

Precautions	Keep away from heat. Open product containers in well ventilated area due to the possible presence of irritating and hydrogen sulfide gas in the headspace. Do not breathe gas, fumes, vapor or spray.
Storage	Keep container dry and in a cool, well-ventilated place. Keep container tightly closed. Store away from extreme heat and away from oxidizing agents, reducing agents, and alkalis.

Section 8 Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	Safety glasses, gloves (impervious), suitable protective clothing. Use NIOSH approved respirator if gas, fumes, mist or vapor is present.
Personal Protection in a Large Spill	Splash goggles, suitable protective clothing, boots, impervious gloves. Use NIOSH approved respirator if gas, fumes, mist or vapor is present.
Exposure Limits	Hydrogen Sulfide: ACGIH-TWA 10 ppm; ACGIH-STEL 15 ppm; OSHA-Ceiling 20 ppm. Good industrial practice suggests observing the ACGIH-OSHA TWA exposure limit of 5 mg/M3 for oil mists.

Section 9 Physical and Chemical Properties



Physical state and appearance	Liquid. (High viscosity)	Odor	Fatty odor (Slight.)
pH (1% soln/water)	Not applicable.	Color	Dark brown-black.
Boiling Point	>176.67°C (350°F)	Specific Gravity	0.98 (Water = 1)
Vapor Pressure	Negligible.	Vapor Density	Not available.
Volatility	<1% (v/v).	Viscosity	Typical Values 1900, SUS, @100 F 41, cSt, @100 C
Evaporation rate	<1 compared to Water	Solubility	Insoluble in cold water, hot water.

Section 10 Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with various substances	Strong oxidizing and reducing agents, strong alkali.
Corrosivity	Not considered to be corrosive for metals and glass according to our database.
Special Remarks on Reactivity	Product is incompatible with strong oxidizing and reducing agents, strong alkali.
Special Remarks on Corrosivity	No additional remark.

Section 11 Toxicological Information

Routes of Entry	Eye contact, skin contact, inhalation, ingestion. No product toxicological data available. The hazard evaluation was based on data on the product components and similar products.
Toxicity to Animals	Acute oral toxicity LD50 [Rat]: >5,000 mg/kg (estimated). Acute dermal toxicity LD50 [Rabbit]: >2,000 mg/kg (estimated).
Chronic Effects on Humans	Not available.
Other Toxic Effects on Humans	No specific information is available in our database regarding the other toxic effects of this material for humans.
Special Remarks on Toxicity to Animals	No additional remark.

<i>Sul-Perm 10 E Lubricant Additive</i>		Page Number: 3	
Special Remarks on Chronic Effects on Humans	No additional remark.		
Special Remarks on other Toxic Effects on Humans	No additional remark.		
Section 12 Ecological Information			
Ecotoxicity	Not available.		
BOD5 and COD	Not available.		
Products of Biodegradation	No documented effects for this product.		
Toxicity of the Products of Biodegradation	Not available.		
Section 13 Disposal Considerations			
Waste Disposal	Recycle if possible. Proper characterization before disposal is recommended. Follow appropriate Federal, State, and Local regulations. Dispose at approved facilities.		
Section 14 Transport Information			
DOT Classification	DRUM: Not regulated by DOT. BULK: Not regulated by DOT.	DOT Identification Number	Not applicable.
Proper Shipping Name	Not applicable.		
Hazardous Substances Reportable Quantity	Not applicable.	Packing Group	Not applicable.
Special Provisions for Transport	No additional remark.		
DOT (Pictograms)			
Section 15 Other Regulatory Information and Pictograms			
Federal and State Regulations	This product appears on the TSCA inventory, Canadian Non-Domestic Substances List (NDSL) and EINECS inventory list. <u>SARA 313 Reportable Chemical(s):</u> None <u>CERCLA RQ's:</u> None <u>State Right-to-Know:</u> No listing for the following: CA Prop 65, FL, MA, MI, MN, NJ, RI. NJ TSRN: 6085		
Other Classifications	WHMIS (Canada) WHMIS CLASS D-2B: Material causing other toxic effects.		
HMIS (U.S.A.)	Health Hazard (2)	Fire Hazard (1)	Reactivity (1) Personal Protection (A)
WHMIS (Canada) (Pictograms)			
Section 16 Other Information			
References	Not available.		
Other Special Considerations	No additional remark.		
MSDS Issue Date: 5/4/99	Validated by Company. Printed 5/5/99. MSDS/ANSI/Petroleum Additives V.1/USA		
Notice to Reader <i>Judgements as to the suitability herein for the purchaser's purposes are necessarily the purchaser's responsibility. Reasonable care has been taken in the preparation of this information, but FERRO EXTENDS NO WARRANTIES, MAKES NO REPRESENTATIONS AND ASSUMES NO RESPONSIBILITY AS TO THE ACCURACY OR SUITABILITY OF THIS INFORMATION FOR ANY PURCHASER'S USE OR FOR ANY CONSEQUENCES OF ITS USE.</i>			

2582

SAP # 013156

Unit 268, 283

**ORONITE**

MATERIAL SAFETY DATA SHEET

OLOA 233FA MSDS N° 264/01/1 15/11/95

Oloa 233FA

1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

COMMERCIAL NAME OLOA 233FA

PRODUCT USE LUBRICATING OIL ADDITIVE

SUPPLIER IDENTIFICATION Chevron Chemical S A - 47 Rue de Villiers - 92527 Neuilly sur Seine Cedex

EMERGENCY TELEPHONE NUMBER (510) 231.06.23 - Richmond 6 - USA

2 COMPOSITION / INFORMATION ON COMPONENTS

60 % Long chain alkyl carboxylic acid XI - R 41 - R 38

3 HAZARDS IDENTIFICATION

R 38 : Irritating to skin

R 41 : risk of serious damage to eyes.

EYES

This material is expected to be a severe eye irritant and may cause permanent eye injury or blindness.

SKIN

This material is expected to be irritating following contact with skin.

INHALATION

This material is not expected to be harmful when inhaled. However, prolonged breathing of vapors/fumes or mists should be avoided.

INGESTION

This material is not expected to be harmful when swallowed.

4 FIRST AID MEASURES

EYES

In case of contact with eyes, rinse immediately with plenty of water. Remove contact lenses if worn. Go to a medical facility.

SKIN	Remove contaminated clothing. Wash skin immediately with soap and water. Seek medical advice if irritation persists. Wash contaminated clothing ; discard contaminated shoes.
INHALATION	No first aid procedures are normally required. If exposed persons feel unwell, move to fresh air. Seek medical advice if signs and symptoms continue.
INGESTION	If swallowed, give water or milk to drink. Do not induce vomiting. If medical advice cannot be obtained, take person and product (or label) to nearest medical emergency treatment facility.

5 FIRE FIGHTING MEASURES

FLASH POINT (COC)	180°C.
EXTINGUISHING MEANS	CO2 - dry chemical - foam - water fog.
FIRE FIGHTING PROCEDURES	For fire involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self contained breathing apparatus.
COMBUSTION PRODUCTS	Normal combustion forms carbon dioxide and water vapor. Incomplete combustion may produce carbon monoxide. See also chapter 10: Stability and Reactivity.

6 ACCIDENTAL RELEASE MEASURES

ENVIRONMENTAL PROTECTION	This material is not expected to be harmful to aquatic organisms. Stop the source of the leak or release. Clean up releases as soon as possible. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.
WORKERS PROTECTION	Avoid contact with eyes and skin. Wear safety goggles, gloves and protective clothing.

7 HANDLING AND STORAGE

HANDLING - STORAGE

The recommended handling temperature is 65°C.
The maximum long life storage temperature is 65°C.
The possible reheating methods are : hot oil; low pressure steam; when product is flowing the heater surface will not exceed 110°C.
At ambient temperature, the shelf life would be at least 1 year.

Keep containers closed when they are stored. Emptied container still contains material which may ignite with explosive violence if heated sufficiently. Keep away of flamme or any source of ignition. Do not use pressure to empty drum or explosion may result.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

EYES

Avoid contact with eyes and face. Wear suitable eye/face protection.

SKIN

Avoid contact with skin or clothing. When handling this material, wear suitable protective clothing including gloves.

INHALATION

No special respiratory protection is normally required. Avoid prolonged or repeated breathing of mists, fumes or vapor.

VENTILATION

No special ventilation is required

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Amber liquid.

ODOUR

Slight oily odour.

DENSITY

0,971 at 15°C (typ)

SOLUBILITY

Soluble in hydrocarbon solvents, Insoluble in water.

VISCOSITY AT 100°C

38 cSt

VISCOSITY AT 40°C

4900 cSt

BOILING TEMPERATURE (Pt 5%)

No data available

MELTING POINT Not applicable

10

STABILITY AND REACTIVITY

STABILITY	Stable below 80°C.
INCOMPATIBILITY	May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc...
POLYMERIZATION	Polymerization will not occur
HAZARDOUS DECOMPOSITION PRODUCTS	No hazardous decomposition.

11

TOXICOLOGICAL INFORMATION

EYES	The hazard evaluation was based on skin irritation data in experimental animals. The 24-72 hr EEC skin irritation scores were : erythema 4.0, edema 3.4.
INHALATION	No toxicology data available.
INGESTION	The acute oral LD50 in rats was : male 2.7 g/kg - female 2.1 g/kg.
EXPOSURE LIMITS	This product contains mineral oil. If vapors or mist are generated air concentration should not exceed 5mg/m3 (exposure limit). In accordance with the most recent EU Dangerous Preparations Directive (draft), we have determined that the base oils used in this preparation are not carcinogenic (ref. IP 346/82: DMSO Extraction Method).

12

ECOLOGICAL INFORMATION

ENVIRONMENTAL IMPACT	This material is not expected to be an environmental hazard.
	No data available.
INVERTEBRATES	No data available.

ALGAES

No data available.

13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

In accordance with european waste catalogue (E.W.C) the codification is the following : C325A696.

PACKAGING DISPOSAL

Containers which have contained this product must be cleaned or treated as waste.

14 TRANSPORT INFORMATION

R.I.D/A.D.R.

Not applicable

I.A.T.A.

Not applicable

I.M.D.G.

Not applicable

Marine Pollutant Not applicable.

15 REGULATORY INFORMATION

INTERNATIONAL REGISTRATION:

E.C (E.I.N.E.C.S.)

All components were notified in accordance with the regulation.

US (T.S.C.A.)

All components were notified in accordance with the regulation.

Japan (MITI)

All components were notified in accordance with the regulation.

Canada (D.S.L.)

All components were notified in accordance with the regulation.

Australia (A.I.C.S.)

All components were notified in accordance with the regulation.

Korea (K.M.O.E)

All components were notified in accordance with the regulation.

Philippines

All components were notified in accordance with the regulation.

Switzerland

This product is registered in Switzerland under OFSP n° : 611484-4.

**CLASSIFICATION -
LABELLING**

Under the criteria of directive EEC/67/548 (dangerous substances) and EEC/88/379 (dangerous preparations) :

MATERIAL SAFETY DATA SHEET
OLOA 233FA MSDS N° 264/01/1 15/11/95



Xi

R 38 : Irritating to skin.

R 41 : risk of serious damage to eyes.

S 24/25 : avoid contact with skin and eyes.

S 26 : in case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36/37/38 : wear suitable protective clothing, gloves and eye/face protection

16 OTHER INFORMATION

The information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since the information contained herein may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the result of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.



Material Safety Data Sheet

HiTEC 055 Performance Additive

MSDS No. H055

(b) (4)

(b) (4)



(b) (4)



(b) (4)



(b) (4)



*** END OF MSDS ***



Material Safety Data Sheet

1862

HiTEC 059 Performance Additive

MSDS no. H059

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Friction Modifier
Date of issue/Revisions 26 June 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
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Afton Chemical Limited
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In Japan:
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : WARNING!
CAUSES EYE IRRITATION.

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	1
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : Not regulated.

Symbol :

Signal word :

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Substance

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
------------------------	----------------	----------------------	--------------------------	-------------------------

No component is present at sufficient concentration to require a hazard classification for health in accordance with EC Directives.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : Wash with soap and water. Get medical attention if irritation develops.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazardous decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
phosphorus oxides

Flash point : Closed cup: 94°C (201.2°F) [Minimum Pensky-Martens.]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Avoid contact with eyes. Wash thoroughly after handling.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal protective equipment

Respiratory system : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).

Skin and body : Disposable outer garments when there is a risk of contact with the material.

- Hands** : Hand Protection: Wear chemical resistant gloves. Nitrile gloves of minimum thickness 0.4 mm have an expected breakthrough time of 480 minutes or less when in frequent contact with the product. Due to variable exposure conditions the user must consider that the practical use of a chemical-protective glove in practice may be much shorter than the permeation time above. Manufacturer's directions for use, especially about the minimum thickness and the minimum breakthrough time, must be observed. This information does not replace suitability tests by the end user since glove protection varies depending on the conditions under which the product is used.
- Eyes** : Safety goggles are considered minimum protection. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

Ingredient nameOEL United StatesOEL CanadaOEL EuropeOEL Australia

Exposure limit not established.

9. Physical and chemical properties

- Physical state and Appearance** : Solid. [Waxy solid.]
- Color** : White.
- Odor** : Pungent.
- Density** : Not determined.
- Specific gravity** : 0.94 @ 15.6/15.6 °C.
- Solubility** :
- Viscosity** : 9.5 cSt @ 60°C
4.0 cSt @ 100°C.
- Melting/Freezing Point (°C):** : 38°C (100.4°F)
- Auto-ignition temperature** : Not determined.
- Flash point** : Closed cup: 94°C (201.2°F) [Minimum Pensky-Martens.]

10. Stability and reactivity

- Stability** : The product is stable.
- Materials to avoid** : Strong oxidizing and reducing agents.
- Conditions to avoid** : High temperatures, sparks, and open flames.

11. Toxicological information

- Routes of entry** : Skin, Eyes, Ingestion, and Inhalation.
- Target organs** : Contains material which may cause damage to the following organs: eyes.

Acute effects

- Inhalation** : Not determined.
- Ingestion** : Not determined.
- Skin contact** : Non-irritating to the skin.
- Eye contact** : Irritating to eyes.
Does not meet EU R41 or R36 classification criteria.

- Adverse effects** : Not determined.

Carcinogenic effects :

Product/ingredient name

ACGIH

IARC

EPA

NIOSH

NTP

OSHA

EU

Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name

HiTEC 059 Performance Additive

ResultLD50 Dermal
LD50 Oral**Species**Rabbit
Rat**Dose**>20000 mg/kg
9050 mg/kg**Exposure**-
-

- Other information** : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		<u>Remarks</u>
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to EU legislation.
 Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not determined.

International Inventory Status

United States (TSCA) : All components are listed or exempted.

Canada : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan (ENCS) : All components are listed or exempted.

Australia (NICNAS) : All components are listed or exempted.

Korea (ECL) : All components are listed or exempted.
China (IECSC) : All components are listed or exempted.
Philippines (PICCS) : All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 6/26/2008.



Date of printing : 7/1/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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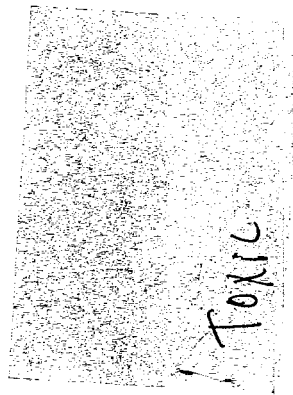
In Europe:
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44-1344-304141

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Singapore Power Building
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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***





Material Safety Data Sheet

HiTEC 082 Performance Additive

MSDS no.

H082

(b) (4)

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*** END OF MSDS ***

Comb (SO)



Material Safety Data Sheet

HiTEC 152 Performance Additive

MSDS no. H152

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Tackiness Additive
Date of issue/Revisions 26 June 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
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Emergency phone: 81-3-5210-4890

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Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : Not regulated.

Symbol :

Signal word :

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	60 - 100	Not classified.	No.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : Wash with soap and water. Get medical attention if irritation develops.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazardous decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Flash point : Closed cup: 155°C (311°F) [Pensky-Martens. Minimum]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Wash thoroughly after handling.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal protective equipment

Respiratory system : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).

Skin and body : Disposable outer garments when there is a risk of contact with the material.

Hands : Use chemical-resistant, impervious gloves.

Eyes : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
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1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	(Canada). TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).
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9. Physical and chemical properties

Physical state and Appearance	: Liquid. [Viscous liquid.]
Color	: Clear. Pale color.
Odor	: Petroleum. [Slight]
Density	: 0.875 g/cm ³ at 15°C
Specific gravity	: 0.875 @ 15.6/15.6°C
Solubility	: Insoluble in the following materials: cold water.
Viscosity	: 2850 cSt at 100°C (target).
Auto-ignition temperature	: Not determined.
Flash point	: Closed cup: 155°C (311°F) [Pensky-Martens. Minimum]

10. Stability and reactivity

Stability	: The product is stable.
Materials to avoid	: Strong oxidizing and reducing agents.
Conditions to avoid	: High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry	: Skin, Eyes, Ingestion, and Inhalation.
Target organs	: None known.
Acute effects	
Inhalation	: Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion	: Not determined.
Skin contact	: Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact	: Non-irritating to the eyes.
Adverse effects	: Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Not determined				

12. Ecological information

Environmental hazards	: Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate	: This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States (TSCA) : All components are listed or exempted.
Canada : All components are listed or exempted.
Europe : All components are listed or exempted.
Japan (ENCS) : All components are listed or exempted.
Australia (NICNAS) : All components are listed or exempted.
Korea (ECL) : All components are listed or exempted.
China (IECSC) : All components are listed or exempted.
Philippines (PICCS) : All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 6/26/2008.



Date of printing : 8/7/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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44-1344-304141

In Singapore:
111 Somerset Road
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Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:
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Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 301 Performance Additive

MSDS no.

H301

(b) (4)

Shaker

(b) (4)



(b) (4)



(b) (4)



(b) (4)



(b) (4)



*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 306 Performance Additive

MSDS No. H306

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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(b) (4)



(b) (4)



(b) (4)



(b) (4)



*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 307 Performance Additive

MSDS no.

H307

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

(b) (4)

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(b) (4)



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*** END OF MSDS ***

Cmb (Sb)



Material Safety Data Sheet

HiTEC 312 Performance Additive

MSDS no. H312

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Extreme Pressure Agent

Date of issue/Revisions 28 November 2007

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
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In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
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North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

The substance is not classified as dangerous according to Directive 67/548/EEC and its amendments.

Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects : WARNING!
Physical/chemical hazards : COMBUSTIBLE. - United States and Canada
VAPOR MAY CAUSE FLASH FIRE.

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	2
Reactivity	0

3. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Substance

Ingredient name

CAS no.

Conc. (% w/w) EU Classification

WHMIS
Regulated?

No component is present at sufficient concentration to require a hazard classification for health in accordance with EC Directives.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation occurs.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Fire/explosion hazards** : COMBUSTIBLE. - United States and Canada
VAPOR MAY CAUSE FLASH FIRE. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Hazardous decomposition products** : These products are carbon oxides (CO, CO₂) Hydrogen Sulfide
- Flash point** : Closed cup: 80°C (176°F). (Pensky-Martens. Minimum)

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5). Do not touch or walk through spilled material.
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.
- Storage** : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
------------------------	--------------------------	-------------------	-------------------	----------------------

 Exposure limit not established.

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. (Clear.)
- Color** : Yellow. to Amber.
- Odor** : Pungent.
- Vapor pressure** : 0.52 mm Hg at 50°C.
- Specific gravity** : 1.135 at 15.6°C (target).

Viscosity : 59 cSt @ 40°C (typical)
8 cSt at 100°C (target).
Flash point : Closed cup: 80°C (176°F). (Pensky-Martens. Minimum)

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.

Target organs : None known.

Acute effects

Inhalation : Non-irritating to the respiratory system.

Ingestion : Not determined.

Skin contact : Non-irritating to the skin.

Eye contact : Non-irritating to the eyes.

Adverse effects : Not determined.

Carcinogenic effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental fate : This product contains components which may be persistent in the environment.

Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	NA1993	Combustible liquids, n.o.s. (sulfurized olefins)	Combustible liquid.	III		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class		-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Fire hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : California Prop. 65: No products were found.

Canadian regulations

WHMIS (Classification) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 11/28/2007.



Date of printing : 11/28/2007.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

In the United States and Canada:
Afton Chemical Corporation
500 Spring Street
Richmond, Virginia
USA 23219-2183
Telephone number: 804-788-5800

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg.
5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***

Combo (SO)

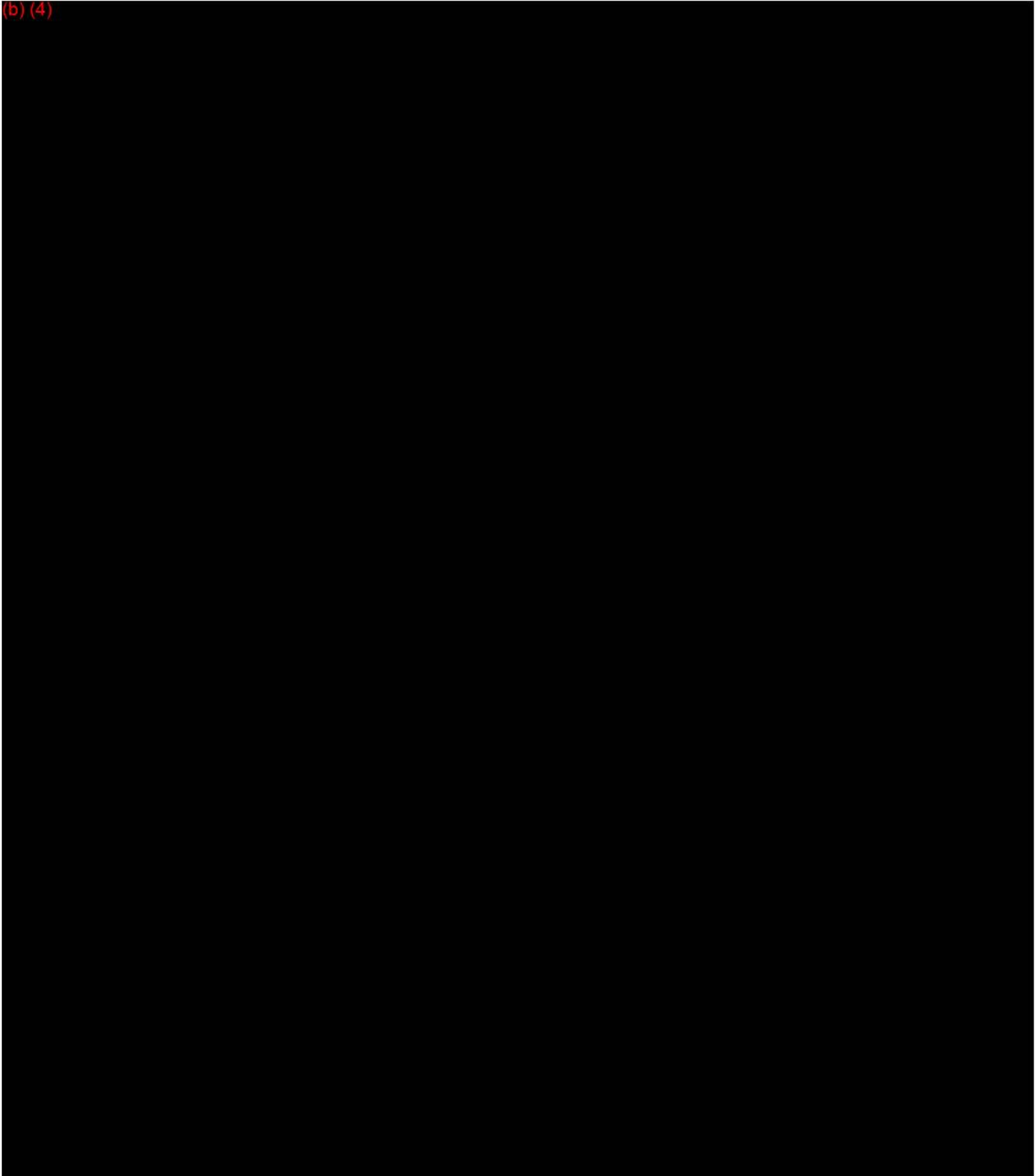


Material Safety Data Sheet

HiTEC 317T Performance Additive

MSDS no. H317T

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*** END OF MSDS ***

Comb (50)



Material Safety Data Sheet

HiTEC 335 Performance Additive

MSDS No. H335

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HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

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Material Safety Data Sheet

HiTEC 340 Performance Additive

MSDS no. H340

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

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Material Safety Data Sheet

HiTEC 343 Performance Additive

MSDS no.

H343

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Comb(SO)



Material Safety Data Sheet

HiTEC 344 Performance Additive

MSDS no.

H344

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 348 Performance Additive

MSDS no. H348

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*** END OF MSDS ***



HiTEC 350C Performance Additive

Material Safety Data Sheet

MSDS No. H350C

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries

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*** END OF MSDS ***

Comb (Sulf Olefins)



Material Safety Data Sheet

HiTEC 355 Performance Additive

MSDS no.

H355

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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***** END OF MSDS *****



Material Safety Data Sheet

MSDS No. H356

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Toxic



Material Safety Data Sheet

HiTEC 362C Performance Additive

MSDS no. H362C

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

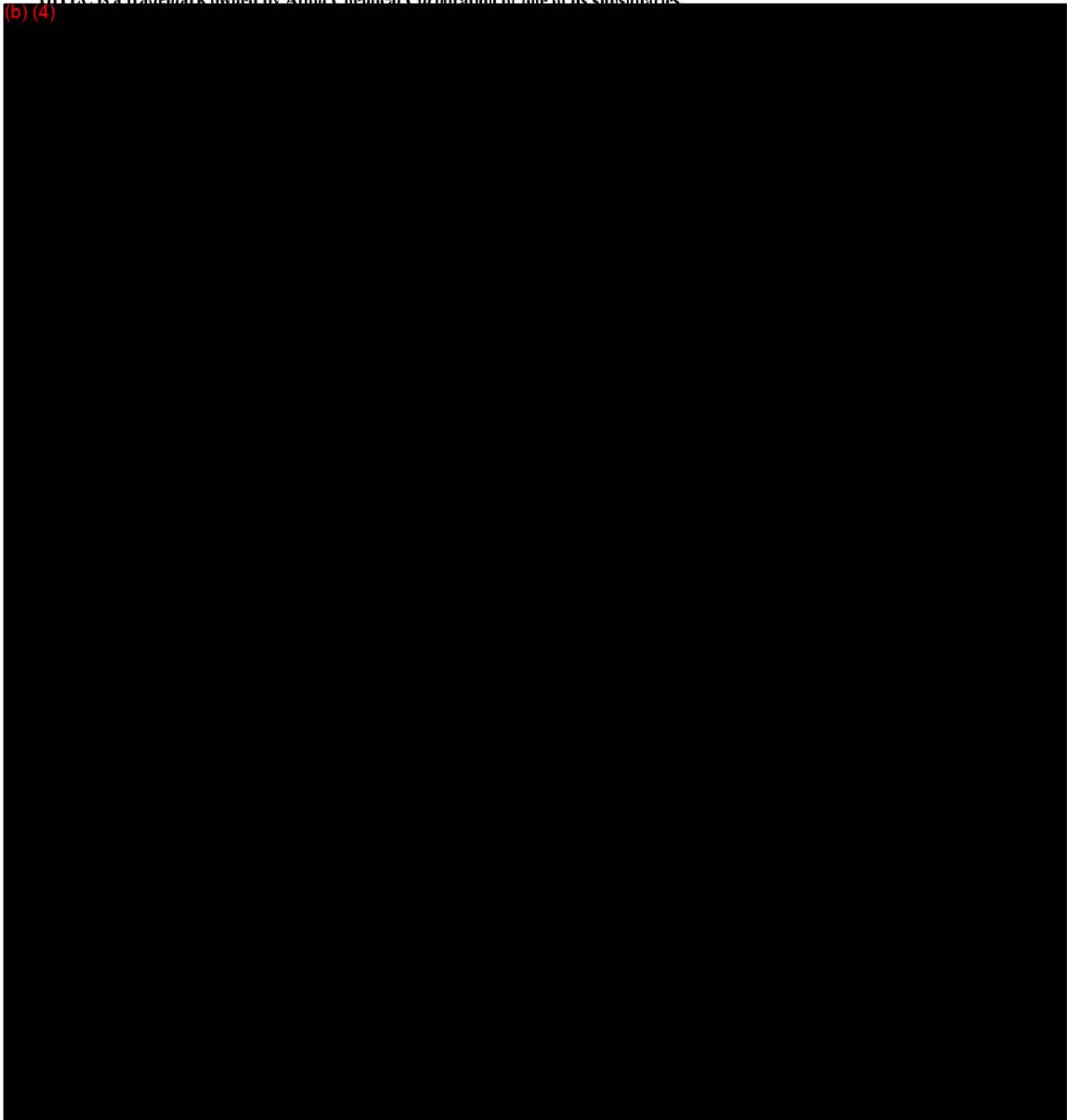
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HiTEC 381 Performance Additive

MSDS no. H381

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Comb (50, 100)



Material Safety Data Sheet

HiTEC 385 Performance Additive

MSDS no. H385

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Cmb (SO, PS)



HiTEC 387 Performance Additive

Material Safety Data Sheet

MSDS No. H387

2945

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

Chemical Family Petrochemical.
Product Use Petrochemical industry: Gear oil additive
CAS No. Mixture.
Validation Date 3 June 2004

In Case of Emergency

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient Name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30-60	Not controlled under DSD (Europe).	No.

3. Hazards Identification

Notice to Reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Primary Hazards and Critical Effects : WARNING!
COMBUSTIBLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
Physical/Chemical Hazards : Combustible.
Environmental Hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(U.S.A.)

Health	0
Fire Hazard	2
Reactivity	0

4. First Aid Measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
Skin Contact : Wash with soap and water. Get medical attention if irritation occurs.
Eye Contact : Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Get medical attention immediately.

5. Fire-Fighting Measures

- Extinguishing Media** : In case of fire, use water spray (fog), foam, dry chemicals, or CO₂.
- Fire-Fighting Procedures** : Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Fire/Explosion Hazards** : Combustible liquid and vapor. Vapor may cause fire.
- Hazardous Decomposition Products** : These products are carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂...), sulfur oxides (SO₂, SO₃...).
- Flash point** : Closed cup: 85°C (185°F). (Pensky-Martens. Minimum)

6. Accidental Release Measures

- Personal Precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Follow all fire fighting procedures (Section 5). Do not touch or walk through spilled material.
- Environmental Precautions and Clean-up Methods** : If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion proof means to transfer material to a sealed, appropriate container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

- Handling** : Keep away from heat, sparks and flame. Avoid prolonged or repeated contact with skin. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. To avoid fire, minimize ignition sources.
- Storage** : Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Keep container in a well-ventilated place.

8. Exposure Controls and Personal Protection

- Engineering Controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protective Equipment

- Respiratory System** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and Body** : Disposable outer garments when there is the potential for contact with the material.
- Hands** : Use chemical resistant, impervious gloves.
- Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Ingredient Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>
Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and Chemical Properties

- Physical State and Appearance** : Liquid. (Clear.)
- Color** : Amber. (Light.)
- Odor** : Pungent. (Slight.)
- Specific Gravity** : 0.964 at 15.6/15.6°C (target).
- Solubility** : Insoluble in cold water.
- Viscosity** : 7.17cSt at 100°C (target).
- Flash Point** : Closed cup: 85°C (185°F). (Pensky-Martens. Minimum)

10. Stability and Reactivity

Stability : The product is stable.

Materials to avoid : Strong oxidizing and reducing agents.

Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : None known.

Target Organs : None known.

Acute Effects

Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Not determined.

Skin Contact : Non-irritating to the skin.

Eye Contact : Non-irritating to the eyes.

Chronic Effects

Adverse Effects : Not determined.

Carcinogenic Effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity Data

<u>Ingredient Name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

Other Information : Not available.

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental Fate : This product contains components which may be persistent in the environment.

Germany water class : Not determined.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	NA1993	Combustible liquids, n.o.s. (Sulfurized olefins, petroleum distillates).	Combustible Liquid.	III		-
TDG Classification	Not regulated.	-	-			-
ADR/RID Class	Not regulated.	-	-			-
IMDG Class	Not regulated.	-	-			-
IATA-DGR Class	Not regulated.	-	-			-

Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Risk Phrases : This product is not classified according to the EU regulations.
Safety Phrases : Not applicable.

US Regulations : No SARA 313 chemicals are present above the reporting threshold.
: SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Fire Hazard
State : California prop. 65: No products were found.

Canadian Regulations

WHMIS (Classification) : Not determined.

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on MITI or MOL
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 6/3/2004.

Version : 1
Date of Printing : 6/3/2004.

☑ Indicates information that has changed from previously issued version.

Notice to Reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

In the United States and Canada:

Afton Chemical Corporation
500 Spring Street
Richmond, Virginia
USA 23219-2183
Telephone number: 804-788-5800

In Singapore:

Afton Chemical Asia Pacific Company
111 Somerset Road #13 - 03
Singapore 238164
Telephone number: 65-6732-0822

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

In Europe:

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 403 Performance Additive

MSDS no.

H403

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 410 Performance Additive

MSDS no.

H410

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 484 Performance Lubricant

MSDS no. H484

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 509 Performance Additive

MSDS no. H509

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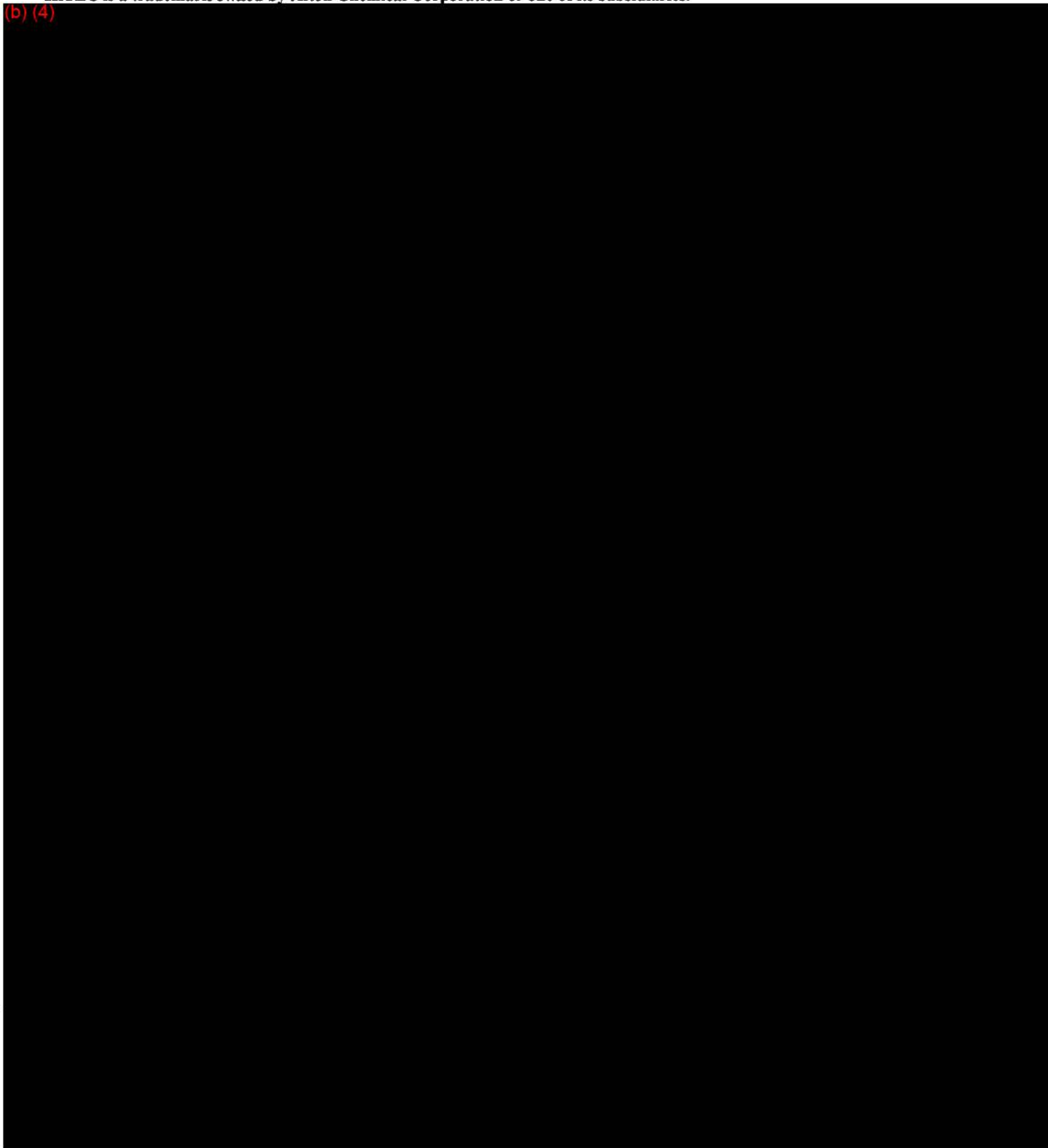
Material Safety Data Sheet

HiTEC 510 Performance Additive

MSDS no. H510

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Comb (50)



Material Safety Data Sheet

5112

HiTEC 511 Performance Additive

MSDS no.

H511

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Flammable Corrosive



HiTEC 514 Performance Additive

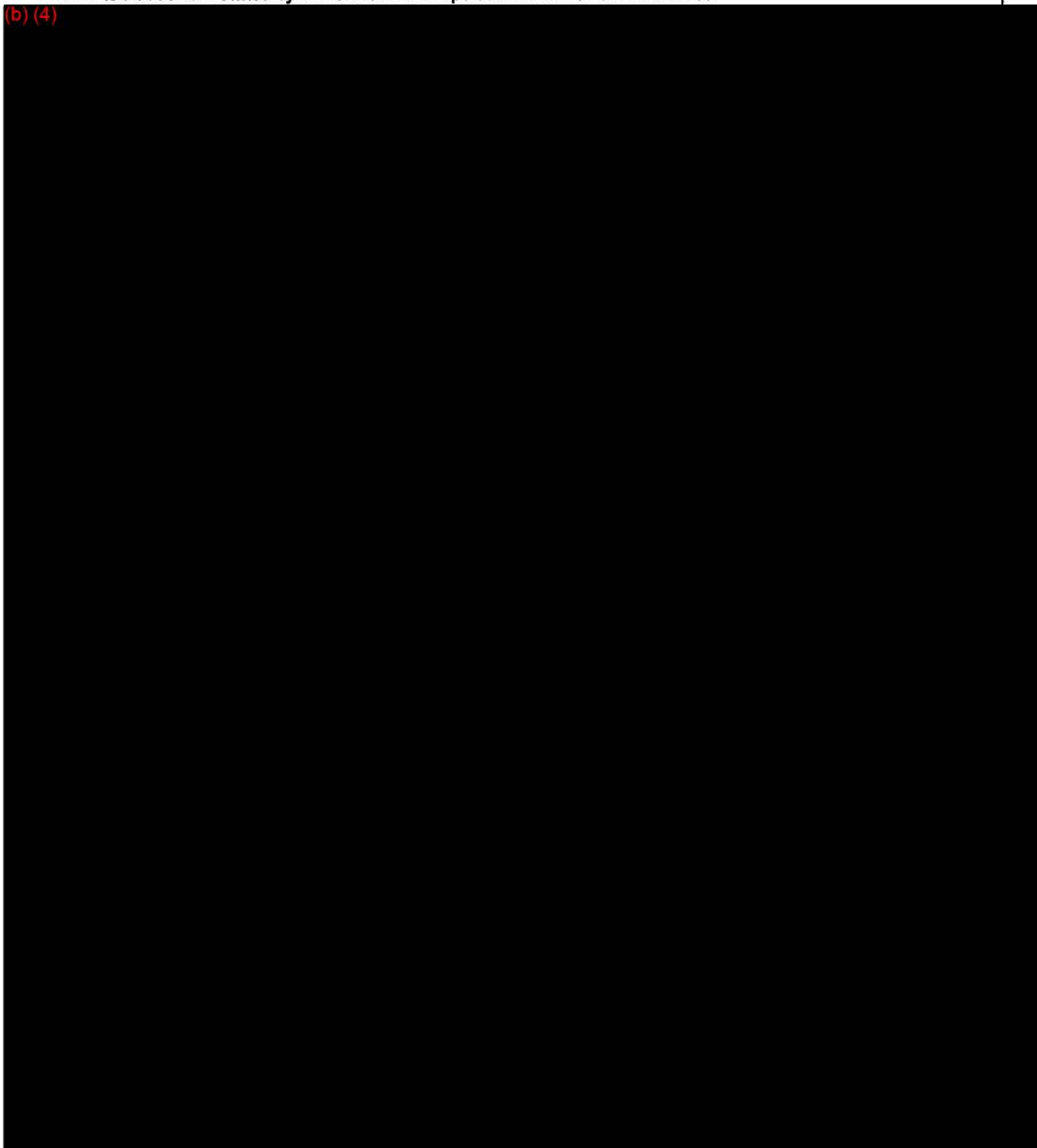
Material Safety Data Sheet

MSDS No. H514

3022

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 521 Performance Additive

MSDS no. H521

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 543 Performance Additive

MSDS no. H543

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 559 Performance Additive

MSDS no. H559

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries

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*** END OF MSDS ***

Toxic

Comb (PD)



Material Safety Data Sheet

HiTEC 567 Performance Additive

MSDS no.

H567

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



ETHYL CORPORATION

MATERIAL SAFETY DATA SHEET

Emergency Telephone Numbers

(800)403-0044(US & CANADA)

(804)648-7727(INTERNATIONAL)

2937

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Material Safety Data Sheet

HiTEC 614 Performance Additive

MSDS no. H614

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Detergent
Date of issue/Revisions 11 March 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The preparation is classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: Classified as hazardous according to the criteria of NOHSC and not classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects : WARNING!
CAUSES SKIN IRRITATION.

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	1
Fire hazard	1
Reactivity	0

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.
Calcium long-chain alkaryl sulfonate	115733-09-0	30 - 60	Xi; R38	Yes.
Calcium formate	544-17-2	1 - 4.9	Not classified.	Yes.
Notice to reader				

** See Section 15 for information concerning WHMIS regulated ingredients marked as proprietary.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : Decomposition products may include the following materials: carbon oxides (CO, CO₂), sulfur oxides (SO₂, SO₃ etc.). Some metallic oxides.
- Flash point** : Closed cup: 150°C (302°F). (Pensky-Martens. Minimum) Open cup: 178°C (352.4°F) (Cleveland.).

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Avoid contact with skin and clothing. Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and body** : Where contact is likely, wear chemical resistant gloves, a chemical resistant suit, and boots. Additional body garments should be used based upon the task being performed.
- Hands** : Use chemical resistant, impervious gloves.
- Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. (Viscous liquid.)
- Color** : Brown. (Dark.)
- Odor** : Pungent. (Slight.)
- Vapor pressure** : 0.22 mm Hg at 70°C.
- Density** : 0.938 g/cm³
- Specific gravity** : 0.94 at 15.6/15.6°C (target).
- Solubility** : Insoluble in the following materials: cold water.

Viscosity : 400 cSt at 40°C (typical).
16 cSt at 100°C (target).
Auto-ignition temperature : Not determined.
Flash point : Closed cup: 150°C (302°F). (Pensky-Martens. Minimum) Open cup: 178°C (352.4°F) (Cleveland.).

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.
Target organs : Contains material which may cause damage to the following organs: skin.
Acute effects
Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion : Not determined.
Skin contact : Irritating to skin.
Not classified as a skin sensitizer. Based on test data for this or similar products.
Eye contact : Non-irritating to the eyes.
Adverse effects : Not determined.

Product/ingredient name ACGIH IARC EPA NIOSH NTP OSHA EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
HiTEC 614 Performance Additive	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.
Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-

ADG Class	Not regulated.	-	-	-	-
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Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Hazard symbol(s)

:



Irritant

Risk phrases

: R38- Irritating to skin.

Safety phrases

: S37- Wear suitable gloves.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Immediate (acute) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : Does not contain any California Prop 65. chemicals

Canadian regulations

WHMIS (Classification) : Class D-2B: Material causing other toxic effects (Toxic).

International Inventory Status

United States inventory (TSCA 8b): All components are listed or exempted.

Canada inventory: All components are listed or exempted.

Europe inventory: All components are listed or exempted.

Japan inventory (ENCS): All components are listed or exempted.

Australia inventory (AICS): All components are listed or exempted.

Korea inventory (KECI): All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HSE Department (Tel: +1 804 788 5800) on 3/11/2008.



Date of printing : 3/11/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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Telephone number: 804-788-5800

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

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Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 619 Performance Additive

MSDS No. H619

1242

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

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HiTEC 637 Performance Additive

MSDS no. H637

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 643D Performance Additive

MSDS no. H643D

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Ashless Dispersant

Date of issue/Revisions 14 August 2007

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
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msds@aftonchemical.com

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Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Reactivity	0

3. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : These products are carbon oxides (CO, CO₂).
- Flash point** : Closed cup: 150°C (302°F). (Pensky-Martens. Minimum) Open cup: >160°C (320°F) (Cleveland.).

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour/hours.	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour/hours.

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. (Viscous liquid.)
- Color** : Brown.
- Odor** : Aromatic.
- Density** : 0.938 g/cm³
- Specific gravity** : 0.94 at 15.6/15.6°C (typical).
- Solubility** : Insoluble in cold water.
- Viscosity** : 590 cSt at 100°C (typical).
- Flash point** : Closed cup: 150°C (302°F). (Pensky-Martens. Minimum) Open cup: >160°C (320°F) (Cleveland.).

10. Stability and reactivity

Stability : The product is stable.

Materials to avoid : Strong oxidizing and reducing agents.

Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.

Target organs : None known.

Acute effects

Inhalation :
Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Ingestion may cause gastrointestinal irritation and diarrhea.

Skin contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye contact : Non-irritating to the eyes.

Adverse effects : Not determined.

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental fate : This product contains components which may be persistent in the environment.

Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

European waste catalogue (EWC) Number : 13-02-05

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : This product contains chemical/chemicals known to the state of California to cause reproductive harm (female).: No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States : All components on TSCA Inventory

Canada : All components on DSL

Europe : All components on EINECS

Japan : All components on METI

Australia : All components on NICNAS

Korea : All components on ECL

China : All components on IECSC

Philippines : All components on PICCS

16. Other information**PREPARATION INFORMATION**

Validated by HS&E Department (Tel: +1 804 788 5800) on 8/14/2007.



Date of printing : 8/16/2007.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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North Sydney, NSW 2060

Australia

Telephone number: 02-9923-1588

Business Hours: 9:00am - 5:00pm

***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 644 Performance Additive

MSDS no. H644

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Dispersant

Date of issue/Revisions 1 July 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
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msds@aftonchemical.com

In Japan:
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
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Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : Not regulated.

Symbol :

Signal word :

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.
Response : Not applicable.
Storage : Not applicable.
Disposal : Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	20 - 30	Not classified.	No.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
Skin contact : Wash with soap and water. Get medical attention if irritation develops.
Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.
Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
Hazardous decomposition products : These products are carbon oxides (CO, CO₂).
Flash point : Closed cup: 150°C (302°F) [Pensky-Martens. Minimum]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Wash thoroughly after handling.
Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Personal protective equipment
Respiratory system : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
Skin and body : Disposable outer garments when there is a risk of contact with the material.
Hands : Hand Protection: Wear chemical resistant gloves. Nitrile gloves of minimum thickness 0.4 mm have an expected breakthrough time of 480 minutes or less when in frequent contact with the product. Due to variable exposure conditions the user must consider that the practical use of a chemical-protective glove in practice may be much shorter than the permeation time above. Manufacturer's directions for use, especially about the minimum thickness and the minimum breakthrough time, must be observed. This information does not replace suitability tests by the end user since glove protection varies depending on the conditions under which the product is used.
Eyes : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m³ STEL: 10 mg/m³ OSHA (United States). TWA: 5 mg/m³	(Canada). TWA: 5 mg/m³ STEL: 10 mg/m³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m³ 8 hour(s).

9. Physical and chemical properties

Physical state and Appearance	: Liquid. [Viscous liquid.]
Color	: Brown. [Dark]
Odor	: Pungent. Aromatic.
Vapor pressure	: 0.18 mm Hg @ 93°C.
Density	: 0.92 g/cm³
Specific gravity	: 0.92 @ 14.5/15.6°C
Solubility	: Insoluble in the following materials: cold water.
Viscosity	: 9900 cSt at 40°C 320 cSt @ 100°C
Auto-ignition temperature	: Not applicable
Flash point	: Closed cup: 150°C (302°F) [Pensky-Martens. Minimum]

10. Stability and reactivity

Stability	: The product is stable.
Materials to avoid	: Strong oxidizing and reducing agents.
Conditions to avoid	: High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry	: Skin, Eyes, Ingestion, and Inhalation.
Target organs	: None known.

Acute effects

Inhalation	: Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion	: Not determined.
Skin contact	:

Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye contact	: Non-irritating to the eyes.
Adverse effects	: Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
HiTEC 644 Performance Additive	LD50 Dermal	Rabbit	>7940 mg/kg	-
	LD50 Oral	Rat	>10000 mg/kg	-

ther information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental fate : This product contains components which may be persistent in the environment.
 Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.
 European waste catalogue (EWC) Number : 13-02-05

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

This product is classified as non hazardous for transport when shipped in non-bulk quantities but when shipped in bulk by road, rail or sea may be classified as UN3257, Elevated temperature liquid, n.o.s., 9, III.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to the EU regulations.
 Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States (TSCA) : All components are listed or exempted.

Canada : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan (ENCS)	:	All components are listed or exempted.
Australia (NICNAS)	:	All components are listed or exempted.
Korea (ECL)	:	All components are listed or exempted.
China (IECSC)	:	All components are listed or exempted.
Philippines (PICCS)	:	All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 7/1/2008.



Date of printing : 7/1/2008.

Indicates information that has changed from previously issued version.

Notice to reader

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44-1344-304141

In Singapore:
111 Somerset Road
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Telephone number: 65-6732-0822

In Japan:
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Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



HiTEC 648 Performance Additive

Material Safety Data Sheet

MSDS No. H648

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

Validation Date 23 March 2005

In Case of Emergency

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Asia)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

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North Sydney, NSW 2060
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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient Name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30-60	Not controlled under DSD (Europe).	No.

3. Hazards Identification

Notice to Reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not reflect classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Primary Hazards and Critical Effects NOTICE!

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(U.S.A.)

Health	0
Fire Hazard	1
Reactivity	0

4. First Aid Measures

- Inhalation** : ☒ Inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin Contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye Contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.

5. Fire-Fighting Measures

- Extinguishing Media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-Fighting Procedures** : Fire fighters should wear positive pressure NIOSH approved self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous Decomposition Products** : These products are carbon oxides (CO, CO₂).
- Flash point** : Closed cup: 150°C (302°F) (Pensky-Martens. Minimum)

6. Accidental Release Measures

- Personal Precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Follow all fire fighting procedures (Section 5).
- Environmental Precautions and Clean-up Methods** : If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

- Handling** : Wash thoroughly after handling.
- Storage** : ☒ Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls and Personal Protection

- Engineering Controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal Protective Equipment**
- Respiratory System** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and Body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Ingredient Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>
Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and Chemical Properties

Physical State and Appearance : Liquid. (Viscous liquid.)
 Color : Brown. (Dark.)
 Vapor Pressure : 0.17 mm Hg at 50°C.
 Specific Gravity : 0.95 at 15.6°C (target).
 Solubility : Insoluble in cold water.
 Viscosity : 475 cSt @ 100°C (target).
 Flash Point : Closed cup: 150°C (302°F)(Pensky-Martens. Minimum)

10. Stability and Reactivity

Stability : The product is stable.
 Materials to avoid : Strong oxidizing and reducing agents.
 Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : None known.
 Target Organs : None known.
 Acute Effects
 Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
 Ingestion : Not determined.
 Skin Contact : Non-irritating to the skin.
 Eye Contact : Non-irritating to the eyes.
 Chronic Effects
 Adverse Effects : Not determined.
 Carcinogenic Effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity Data

Ingredient Name	Test	Result	Route	Species
HiTEC 648 Performance Additive	LD50	>5000 mg/kg	Oral	Rat
	LD50	>2000 mg/kg	Dermal	Rabbit

Other Information : Not available.

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental Fate : This product contains components which may be persistent in the environment.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	Not regulated.	-	-			
TDG Classification	Not regulated.	-	-			
ADR/RID Class	Not regulated.	-	-			-
IMDG Class	Not regulated.	-	-			-
IATA-DGR Class	Not regulated.	-	-			-

Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Risk Phrases : This product is not classified according to the EU regulations.

Safety Phrases : Not applicable.

US Regulations : No SARA 313 chemicals are present above the reporting threshold.

: SARA 311/312 Nuisance Mist/Dust Only.

State : California prop. 65: No products were found.

Canadian Regulations

WHMIS (Classification) : Not a WHMIS controlled material. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the CPR.

International Inventory Status

United States : All components on TSCA Inventory

Canada : All components on DSL

Europe : All components on EINECS

Japan : All components on METI

Australia : All components on NICNAS

Korea : All components on ECL

China : All components on IECSC

Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by _HS&E Department (Tel: +1 804 788 5800) on 3/23/2005.

Version : 1

Date of Printing : 3/24/2005.

☒ Indicates information that has changed from previously issued version.

Notice to Reader

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London Road, Bracknell, Berkshire

RG12 2UW, England

44-1344-304141

*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 672 Performance Additive

MSDS No. H672

1860

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 675 Performance Additive

MSDS no. H675

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Antiwear Hydraulic Oil Additive

Date of issue/Revisions 9 July 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
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6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : WARNING!
CAUSES EYE AND SKIN IRRITATION.

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	1
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
AQUATIC TOXICITY (CHRONIC) - Category 3

Symbol



Signal word : Warning

Hazard statements : Causes skin irritation.
Causes eye irritation.
Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : Wear protective gloves. Avoid release to the environment. Wash thoroughly after handling.

Response : IF ON SKIN: Take off contaminated clothing and wash before re-use. Wash with plenty of soap and water. If skin irritation occurs, seek medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Wash hands after handling.

Storage : Not applicable.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Zinc dialkyl dithiophosphate	68649-42-3	60 - 100	Xi; R36/38	Yes.
Mineral Oil	Mixture.	10 - 19.9	Not classified.	No.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazardous decomposition products : Decomposition products may include the following materials: carbon oxides (CO, CO₂) and Metallic oxides.
Hydrogen sulfide.

Flash point : Closed cup: 122°C (251.6°F) [Minimum Pensky-Martens.]
Open cup: >140°C (>284°F) [Cleveland.]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and body** : Where contact is likely, wear chemical resistant gloves, a chemical resistant suit, and boots. Additional body garments should be used based upon the task being performed.
- Hands** : Hand Protection: Wear chemical resistant gloves. Nitrile gloves of minimum thickness 0.4 mm have an expected breakthrough time of 480 minutes or less when in frequent contact with the product. Due to variable exposure conditions the user must consider that the practical use of a chemical-protective glove in practice may be much shorter than the permeation time above. Manufacturer's directions for use, especially about the minimum thickness and the minimum breakthrough time, must be observed. This information does not replace suitability tests by the end user since glove protection varies depending on the conditions under which the product is used.
- Eyes** : Safety goggles are considered minimum protection. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits**Ingredient name**

1) Mineral Oil

OEL United States

ACGIH (United States).

TWA: 5 mg/m³STEL: 10 mg/m³

OSHA (United States).

TWA: 5 mg/m³**OEL Canada**

(Canada).

TWA: 5 mg/m³STEL: 10 mg/m³**OEL Europe**

EH40 (UK) (Europe, 2002).

TWA: 5 mg/m³ 8 hour(s).**OEL Australia**

NOHSC (Australia, 2003).

TWA: 5 mg/m³ 8 hour(s).**9. Physical and chemical properties**

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Clear. and Yellow. Green. to Amber.
- Odor** : Aromatic. [Slight]
- apor pressure** : 0.18 mm Hg at 70°C
- Density** : 1.078 g/cm³
- Specific gravity** : 1.080 at 15.6°C
- Solubility** : Insoluble in the following materials: cold water.
- Viscosity** : 180 cSt at 40°C
- Auto-ignition temperature** : Not determined.
- Flash point** : Closed cup: 122°C (251.6°F) [Minimum Pensky-Martens.]
Open cup: >140°C (>284°F) [Cleveland.]

10. Stability and reactivity

- Stability** : The product is stable.
- Materials to avoid** : Strong oxidizing and reducing agents.
- Conditions to avoid** : High temperatures, sparks, and open flames.

11. Toxicological information

- Routes of entry** : Skin, Eyes, Ingestion, and Inhalation.
- Target organs** : Contains material which may cause damage to the following organs: gastrointestinal tract, skin, eyes.
- Acute effects**
- Inhalation** : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
- Ingestion** :
Ingestion may cause gastrointestinal irritation and diarrhea.
- Skin contact** : Irritating to skin.
- Eye contact** : Irritating to eyes.
- Adverse effects** : Not determined.

Carcinogenic effects :**Product/ingredient name**

ACGIH

IARC

EPA

NIOSH

NTP

OSHA

EU

Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Zinc dialkyl dithiophosphate	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>2000 mg/kg	-

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental fate : This product contains components which may be persistent in the environment.

Germany water class : 2

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

European waste catalogue (EWC) Number : 13-01-10

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		
IMDG Class	Not regulated.	-	-	-		
IATA-DGR Class	Not regulated.	-	-	-		
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Hazard symbol(s) :



Irritant

Risk phrases : R36/38- Irritating to eyes and skin.

Safety phrases : S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S28- After contact with skin, wash immediately with plenty of water.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : Zinc dialkyl dithiophosphate

60 - 100%

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Immediate (acute) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WIIMIS (Classification) : Class D-2B: Material causing other toxic effects (Toxic).

International Inventory Status

United States (TSCA) : All components are listed or exempted.

Canada : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan (ENCS) : All components are listed or exempted.

Australia (NICNAS) : All components are listed or exempted.

Korea (ECL) : All components are listed or exempted.

China (IECSC) : All components are listed or exempted.

Philippines (PICCS) : All components are listed or exempted.

16. Other information**PREPARATION INFORMATION**

Validated by IIS&E Department (Tel: +1 804 788 5800) on 7/9/2008.



Date of printing : 7/9/2008.

Indicates information that has changed from previously issued version.

Notice to reader

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Telephone number: 804-788-5800

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44-1344-304141

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



Material Safety Data Sheet

2982

HiTEC 680 Performance Additive

MSDS no. H680

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Antiwear Hydraulic Oil Additive

Date of issue/Revisions 9 July 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
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44 1344-304141
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In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : WARNING!
CAUSES EYE AND SKIN IRRITATION.

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	1
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
AQUATIC TOXICITY (CHRONIC) - Category 3

Symbol :



Signal word : Warning

Hazard statements : Causes skin irritation.
Causes eye irritation.
Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : Wear protective gloves. Avoid release to the environment. Wash thoroughly after handling.

Response : IF ON SKIN: Take off contaminated clothing and wash before re-use. Wash with plenty of soap and water. If skin irritation occurs, seek medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Wash hands after handling.

Storage : Not applicable.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Zinc dialkyl dithiophosphate	68649-42-3	60 - 100	Xi; R36/38	Yes.
Mineral Oil	Mixture.	10 - 19.9	Not classified.	No.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazardous decomposition products : Decomposition products may include the following materials: carbon oxides (CO, CO₂) and Metallic oxides.
Hydrogen sulfide.

Flash point : Closed cup: 122°C (251.6°F) [Minimum Pensky-Martens.]
Open cup: >140°C (>284°F) [Cleveland.]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and body** : Where contact is likely, wear chemical resistant gloves, a chemical resistant suit, and boots. Additional body garments should be used based upon the task being performed.
- Hands** : Hand Protection: Wear chemical resistant gloves. Nitrile gloves of minimum thickness 0.4 mm have an expected breakthrough time of 480 minutes or less when in frequent contact with the product. Due to variable exposure conditions the user must consider that the practical use of a chemical-protective glove in practice may be much shorter than the permeation time above. Manufacturer's directions for use, especially about the minimum thickness and the minimum breakthrough time, must be observed. This information does not replace suitability tests by the end user since glove protection varies depending on the conditions under which the product is used.
- Eyes** : Safety goggles are considered minimum protection. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	(Canada). TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Clear. and Yellow. Green. to Amber.
- Odor** : Aromatic. [Slight]
- Vapor pressure** : 0.18 mm Hg at 70°C
- Density** : 1.078 g/cm³
- Specific gravity** : 1.080 at 15.6°C
- Solubility** : Insoluble in the following materials: cold water.
- Viscosity** : 180 cSt at 40°C
- Auto-ignition temperature** : Not determined.
- Flash point** : Closed cup: 122°C (251.6°F) [Minimum Pensky-Martens.]
Open cup: >140°C (>284°F) [Cleveland.]

10. Stability and reactivity

- Stability** : The product is stable.
- Materials to avoid** : Strong oxidizing and reducing agents.
- Conditions to avoid** : High temperatures, sparks, and open flames.

11. Toxicological information

- Routes of entry** : Skin, Eyes, Ingestion, and Inhalation.
- Target organs** : Contains material which may cause damage to the following organs: gastrointestinal tract, skin, eyes.
- Acute effects**
- Inhalation** : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
- Ingestion** :
Ingestion may cause gastrointestinal irritation and diarrhea.
- Skin contact** : Irritating to skin.
- Eye contact** : Irritating to eyes.
- Adverse effects** : Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Zinc dialkyl dithiophosphate	LD50 Dermal	Rat	>2000 mg/kg	-
	LD50 Oral	Rat	>2000 mg/kg	-

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.
Germany water class : 2

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.
European waste catalogue (EWC) Number : 13-01-10

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		
IMDG Class	Not regulated.	-	-	-		
IATA-DGR Class	Not regulated.	-	-	-		
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Hazard symbol(s) :



Irritant

Risk phrases : R36/38- Irritating to eyes and skin.

Safety phrases : S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S28- After contact with skin, wash immediately with plenty of water.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : Zinc dialkyl dithiophosphate

60 - 100%

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Immediate (acute) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Class D-2B: Material causing other toxic effects (Toxic).

International Inventory Status

United States (TSCA) : All components are listed or exempted.

Canada : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan (ENCS) : All components are listed or exempted.

Australia (NICNAS) : All components are listed or exempted.

Korea (ECL) : All components are listed or exempted.

China (IECSC) : All components are listed or exempted.

Philippines (PICCS) : All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 7/9/2008.



Date of printing : 7/9/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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500 Spring Street
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111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

*** END OF MSDS ***



Material Safety Data Sheet



HITEC 686 INTERMEDIATE (ADDUCT)

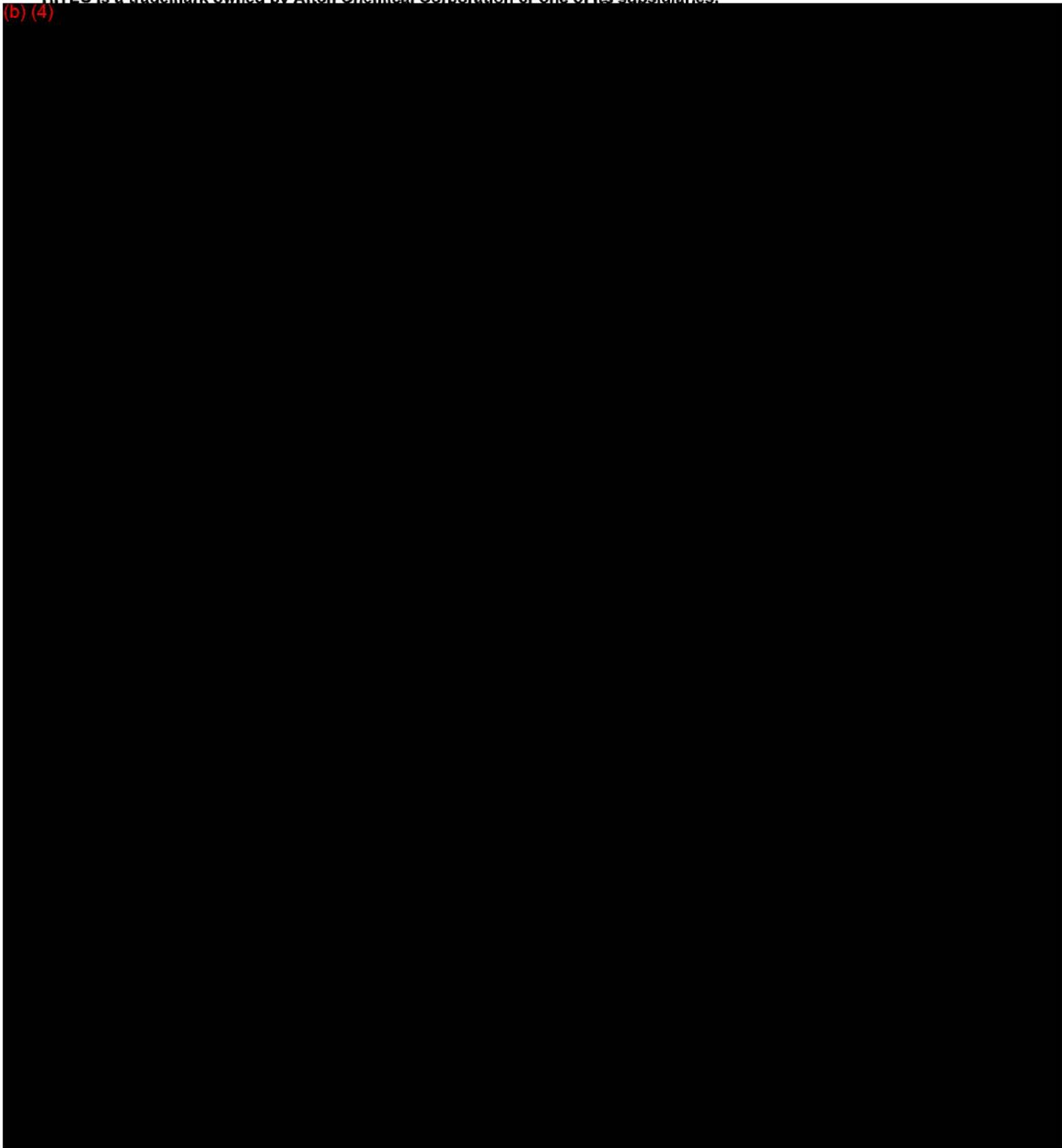
MSDS No.

H686I

2781

HITEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 833 Performance Additive

MSDS No. H833

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries

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*** END OF MSDS ***

Toxic

1.



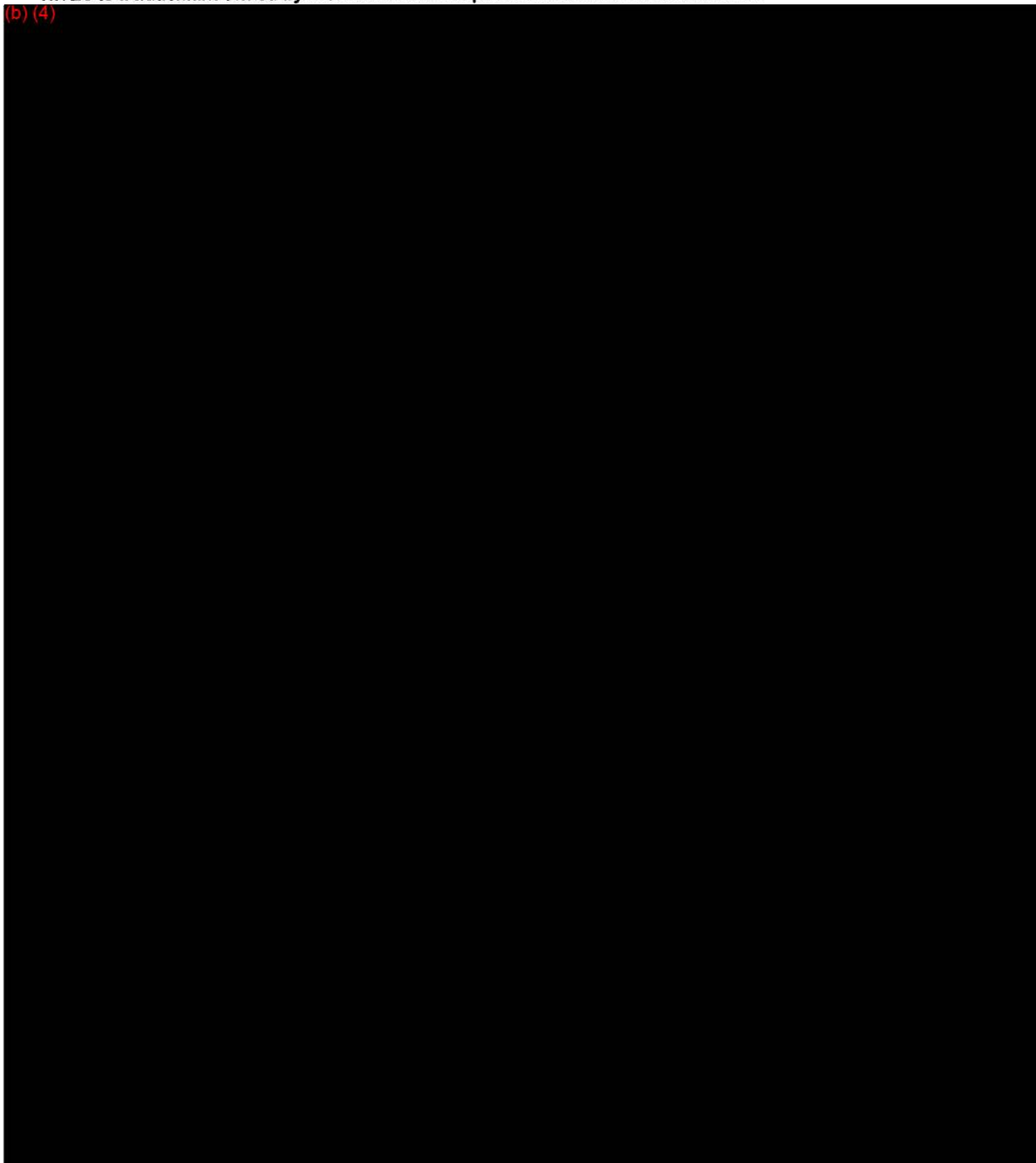
Material Safety Data Sheet

HiTEC 953 Performance Additive

MSDS no. H953

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 1272 Performance Additive

MSDS no.

H1272

2937

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*** END OF MSDS ***



HITEC 1463C Performance Additive

Material Safety Data Sheet

MSDS No. H1463C

HITEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 1919 Performance Additive

MSDS no. H1919

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Ashless Dispersant

Date of issue/Revisions 30 June 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : Not regulated.

Symbol :

Signal word :

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

EPAPA005000303

Prevention	: Not applicable.
Response	: Not applicable.
Storage	: Not applicable.
Disposal	: Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.

4. First aid measures

Inhalation	: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion	: If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
Skin contact	: Wash with soap and water. Get medical attention if irritation develops.
Eye contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media	: In case of fire, use water spray (fog), foam, dry chemical or CO ₂ .
Fire-fighting procedures	: Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
Hazardous decomposition products	: Decomposition products may include the following materials: carbon oxides (CO, CO ₂)
Flash point	: Closed cup: 160°C (320°F) [Pensky-Martens. Minimum]

6. Accidental release measures

Personal precautions	: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
Environmental precautions and clean-up methods	: If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling	: Wash thoroughly after handling.
Storage	: Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

Engineering controls	: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Personal protective equipment	
Respiratory system	: Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
Skin and body	: Disposable outer garments when there is a risk of contact with the material.
Hands	: Use chemical-resistant, impervious gloves.
Eyes	: Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
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1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m³ STEL: 10 mg/m³ OSHA (United States). TWA: 5 mg/m³	(Canada). TWA: 5 mg/m³ STEL: 10 mg/m³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m³ 8 hour(s).
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9. Physical and chemical properties

Physical state and Appearance	: Liquid. [Viscous liquid.]
Color	: Red.
Density	: 0.909 g/cm³ at 15.6°C
Specific gravity	: 0.911 at 15.6/15.6°C (target).
Solubility	: Insoluble in the following materials: cold water.
Viscosity	: 260 cSt @ 100°C (target).
Auto-ignition temperature	: Not determined.
Flash point	: Closed cup: 160°C (320°F) [Pensky-Martens. Minimum]

10. Stability and reactivity

Stability	: The product is stable.
Materials to avoid	: Strong oxidizing and reducing agents.
Conditions to avoid	: High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry	: Skin, Eyes, Ingestion, and Inhalation.
Target organs	: None known.
Acute effects	
Inhalation	: Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion	: Not determined.
Skin contact	: Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact	: Non-irritating to the eyes.
Adverse effects	: Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Mineral Oil	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
Polyolefin	LD50 Dermal	Rabbit	>10250 mg/kg	-
	LD50 Oral	Rat	>34600 mg/kg	-
	LC50 Inhalation	Rat	>17.3 mg/L	4 hours
	Vapor			

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental fate : This product contains components which may be persistent in the environment.
 Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.
 European waste catalogue (EWC) Number : 13-02-05

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to EU legislation.
 Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) :

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not a WHMIS controlled material.

International Inventory Status

United States (TSCA) : All components are listed or exempted.

Canada : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan (ENCS) : All components are listed or exempted.
Australia (NICNAS) : All components are listed or exempted.
Korea (ECL) : All components are listed or exempted.
China (IECSC) : All components are listed or exempted.
Philippines (PICCS) : All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 6/30/2008.



Date of printing : 7/1/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

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500 Spring Street
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USA 23219-2183
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Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
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North Sydney, NSW 2060
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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 1921 Performance Additive

MSDS No. H1921

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Petrochemicals.
Validation date 6 June 2007

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141

In Japan:
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Sumitomo Fudousan Sanbancho Bldg. 5F
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.

3. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : These products are carbon oxides (CO, CO₂).
- Flash point** : Closed cup: 160°C (320°F). (Pensky-Martens. Closed cup)

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Inгредиент name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour/hours.	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour/hours.

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. (Viscous liquid.)
- Color** : Red.
- Density** : 0.908 g/cm³
- Specific gravity** : 0.91 at 15.6°C
- Solubility** : Insoluble in cold water.
- Viscosity** : 380 cSt @ 100°C
- Flash point** : Closed cup: 160°C (320°F). (Pensky-Martens. Closed cup)

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.
Target organs : None known.
Acute effects
Inhalation :
Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion : Not determined.
Skin contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact : Non-irritating to the eyes.
Adverse effects : Not determined.
Carcinogenic effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical : No SARA 313 chemicals are present above the reporting threshold.
notification and release
reporting (w/w%)

SARA 311/312 Hazardous : SARA 311/312 Nuisance Mist/Dust Only
Categorization

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not determined.

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other information

PREPARATION INFORMATION

Validated by _HS&E Department (Tel: +1 804 788 5800) on 6/6/2007.

Date of printing : 6/6/2007.

☒ Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

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In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company

Level 9, 20 Berry Street

North Sydney, NSW 2060

Australia

Telephone number: 02-9923-1588

Business Hours: 9:00am - 5:00pm

***** END OF MSDS *****

Com 6 (PD)



Material Safety Data Sheet

HITEC 2375A Performance Additive

MSDS No.

H2375A

HITEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 3191 Performance Additive

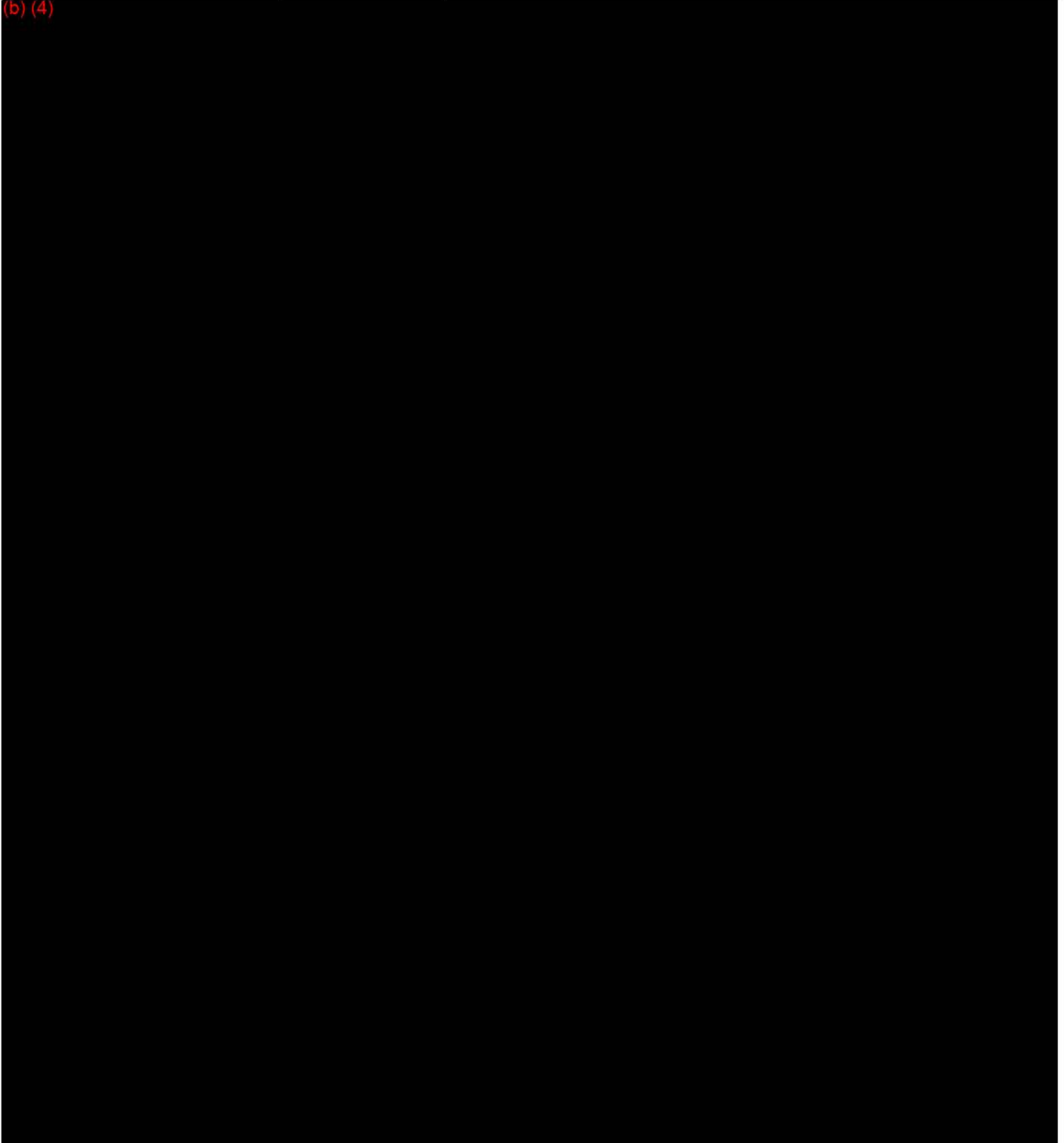
MSDS no.

H3191

2981

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 3478 Performance Additive

MSDS No. H3478

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 4313 Performance Additive

MSDS no. H4313

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Corrosion Inhibitor

Date of issue/Revisions 9 July 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
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1-804-788-5800

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Emergency phone: 81-3-5210-4890

In Australia:
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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : Not regulated.

Symbol :

Signal word :

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHIMIS Regulated?</u>
------------------------	----------------	----------------------	--------------------------	--------------------------

No component is present at sufficient concentration to require a hazard classification for health in accordance with EC Directives.

4. First aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Ingestion : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Skin contact : Wash with soap and water. Get medical attention if irritation develops.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Fire-fighting procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazardous decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides

Flash point : Closed cup: 130°C (266°F) [Pensky-Martens. Minimum]
Open cup: >150°C (>302°F) [Cleveland.]

6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).

Environmental precautions and clean-up methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Wash thoroughly after handling.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal protective equipment

Respiratory system : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).

Skin and body : Disposable outer garments when there is the potential for contact with the material.

Hands : Use chemical-resistant, impervious gloves.

Eyes : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

Ingredient name

OEL United States

OEL Canada

OEL Europe

OEL Australia

Exposure limit not established.

9. Physical and chemical properties

Physical state and Appearance	: Liquid. [Clear viscous liquid.]
Color	: Yellow. to Amber. [Light]
Odor	: Pungent. [Slight]
Density	: 1.12 g/cm ³ at 15°C
Specific gravity	: 1.12 at 15.6°C (target).
Solubility	:
Viscosity	: 340 cSt at 40°C 13.6 cSt at 100°C (target).
Auto-ignition temperature	: Not determined.
Flash point	: Closed cup: 130°C (266°F) [Pensky-Martens. Minimum] Open cup: >150°C (>302°F) [Cleveland.]

10. Stability and reactivity

Stability	: The product is stable.
Materials to avoid	: Strong oxidizing and reducing agents.
Conditions to avoid	: High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry	: Skin, Eyes, Ingestion, and Inhalation.
Target organs	: None known.

Acute effects

Inhalation	: Practically non-toxic by inhalation. Does not meet EU classification criteria. Based on test data for this or similar products.
Ingestion	: Practically non-toxic if swallowed. Based on test data for this or similar products.
Skin contact	: Non-irritating to the skin. Based on test data for this or similar products.
Eye contact	: Non-irritating to the eyes. Based on test data for this or similar products.
Adverse effects	: Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
HiTEC 4313 Performance Additive	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>10000 mg/kg	-
	LC50 Inhalation	Rat	>2.75 mg/L	4 hours
	Vapor			

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental fate : This product contains components which may be persistent in the environment.
 Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information**EU regulations**

Risk phrases : This product is not classified according to EU legislation.
 Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.
 SARA 311/312 Hazardous Categorization : **SARA 311/312 MSDS distribution - chemical inventory - hazard identification** No products were found.
 RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.
 State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States (TSCA) : **United States inventory (TSCA 8b):** All components are listed or exempted.
 Canada : **Canada inventory:** All components are listed or exempted.
 Europe : **Europe inventory:** All components are listed or exempted.
 Japan (ENCS) : **Japan inventory (ENCS):** All components are listed or exempted.
 : **Australia inventory (AICS):** All components are listed or exempted.

Australia (NICNAS)

Korea (ECL) : Korea inventory (KECI): All components are listed or exempted.

China (IECSC) : China inventory (IECSC): All components are listed or exempted.

Philippines (PICCS) : Philippines inventory (PICCS): All components are listed or exempted.

16. Other information**PREPARATION INFORMATION**

Validated by HS&E Department (Tel: +1 804 788 5800) on 7/9/2008.



Date of printing : 10/28/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION**In the United States and Canada:**

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Telephone number: 804-788-5800

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London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:

11 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:

Afton Chemical Japan Corporation
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In Australia:

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North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



HiTEC 4995 Fuel Additive

Material Safety Data Sheet

MSDS No. H4995

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 5002 Performance Additive

MSDS No. H5002

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*** END OF MSDS ***

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Material Safety Data Sheet

HiTEC 5096 Performance Additive

MSDS no. H5096

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Emulsifying agent.
Date of issue/Revisions 27 November 2007

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
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Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
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msds@aftonchemical.com

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

3. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	10 - 19.9	Not classified.	No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : These products are carbon oxides (CO, CO₂)
- Flash point** : Closed cup: 140°C (284°F). (Pensky-Martens. Minimum)

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Inгредиент name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour/hours.	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour/hours.

9. Physical and chemical properties

- Physical state and Appearance** : Liquid.
- Color** : Orange. to Brown.
- Specific gravity** : 0.926 @ 15.6/15.6 °C
- viscosity** : 14900 cSt @ 40°C
250 cSt @ 100°C
- Flash point** : Closed cup: 140°C (284°F). (Pensky-Martens. Minimum)

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.

Target organs : None known.

Acute effects

Inhalation :
Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Not determined.

Skin contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye contact : Non-irritating to the eyes.

Adverse effects : Not determined.

Carcinogenic effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : ~~S~~AARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.

RQ (Reportable quantity) : ~~R~~ERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 11/27/2007.



Date of printing : 11/27/2007.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

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In Singapore:
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#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Europe:
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Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg.
5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 6130 Performance Additive

MSDS no. H6130

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Diesel Oil Treatment Package

Date of issue/Revisions 28 April 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

Ingredient name

Mineral Oil

CAS no.

Mixture.

Conc. (% w/w)

30 - 60

EU Classification

Not classified.

WHMIS Regulated?

No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and body** : Disposable outer garments when there is the potential for contact with the material.
- Hands** : Use chemical-resistant, impervious gloves.
- Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	(Canada). TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Amber. [Dark]
- Odor** : Mild. Petroleum.
- Specific gravity** : 0.92 @ 15.6°C (target)
- Solubility** : Insoluble in the following materials: cold water.
- Viscosity** : 7120 cSt at 40°C
230 cSt @ 100°C (target)
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.

Target organs : None known.

Acute effects

Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Not determined.

Skin contact :

Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye contact : Non-irritating to the eyes.

Adverse effects : Not determined.

Product/ingredient name ACGIH IARC EPA NIOSH NTP OSHA EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Not determined.				

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

Additional warning phrases :

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.
SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only
RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.
State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States inventory (TSCA 8b): All components are listed or exempted.

Canada inventory: All components are listed or exempted.

Europe inventory: All components are listed or exempted.

Japan inventory (ENCS): All components are listed or exempted.

Australia inventory (AICS): All components are listed or exempted.

Korea inventory (KECI): All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 4/28/2008.



Date of printing : 4/28/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

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111 Somerset Road
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Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 6130 Performance Additive

MSDS no. H6130

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Diesel Oil Treatment Package

Date of issue/Revisions 28 April 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
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In Japan:

Afton Chemical Japan Corporation
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Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

Ingredient name

Mineral Oil

CAS no.

Mixture.

Conc. (% w/w)

30 - 60

EU Classification

Not classified.

WHMIS
Regulated?
No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical-resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Inгредиент name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	(Canada). TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Amber. [Dark]
- Odor** : Mild. Petroleum.
- Specific gravity** : 0.92 @ 15.6°C (target)
- Solubility** : Insoluble in the following materials: cold water.
- Viscosity** : 7120 cSt at 40°C
230 cSt @ 100°C (target)
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.
Target organs : None known.
Acute effects
Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion : Not determined.
Skin contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact : Non-irritating to the eyes.
Adverse effects : Not determined.

Product/ingredient name ACGIH IARC EPA NIOSH NTP OSHA EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Not determined.				

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

Additional warning phrases :

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.
SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only
RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.
State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States inventory (TSCA 8b): All components are listed or exempted.

Canada inventory: All components are listed or exempted.

Europe inventory: All components are listed or exempted.

Japan inventory (ENCS): All components are listed or exempted.

Australia inventory (AICS): All components are listed or exempted.

Korea inventory (KECI): All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 4/28/2008.



Date of printing : 4/28/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

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London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:

111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
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North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

***** END OF MSDS *****



HiTEC 6303 Performance Additive

Material Safety Data Sheet

MSDS No. H6303

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 6403 Fuel Additive

MSDS no.

H6403

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



HiTEC 6416 Fuel Additive

Material Safety Data Sheet

MSDS No.

H6416

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 6421J Fuel Additive

MSDS No. H6421J

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

Product Use Petrochemical industry: Fuel additive.

Validation Date 29 November 2006

In Case of Emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Solvent naphtha (petroleum), light aromatic	64742-95-6	30 - 60	R10 Xn; R65 Xi; R37 R66, R67 N; R51/53	Yes.
Polyolefin alkyl phenol alkyl amine	proprietary	20 - 30	Xi; R36/38	Yes.
Benzene, 1,2,4-trimethyl-	95-63-6	10 - 19.9	R10 Xn; R20 Xi; R36/37/38 N; R51/53	Yes.
Benzene, 1,3,5-trimethyl-	108-67-8	5 - 9.9	R10 Xi; R37 N; R51/53	Yes.
N-Propylbenzene	103-65-1	1 - 4.9	R10 Xn; R65 Xi; R37 N; R51/53	Yes.
2-Ethyl hexanol	104-76-7	1 - 4.9	Xi; R36/38	Yes.
Xylene	1330-20-7	1 - 4.9	R10 Xn; R20/21 Xi; R38	Yes.
Cumene	98-82-8	1 - 4.9	R10 Xn; R65 Xi; R37 N; R51/53	Yes.
Benzene, 1,2,3-trimethyl-	526-73-8	1 - 4.9	R10	Yes.
Solvent naphtha (petroleum), heavy aromatic	64742-94-5	0.5 - 0.99	Xn; R65 R66, R67 N; R51/53	Yes.
Alkyl phenol	proprietary	0 - 0.1	Xn; R22	Yes.

3. Hazards Identification

Notice to Reader

After operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classified as hazardous according to the criteria of NOHSC and classified as dangerous goods according to the ADG Code.

Primary Hazards and Critical Effects : WARNING!
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
ASPIRATION HAZARD IF SWALLOWED.

Physical/Chemical Hazards : COMBUSTIBLE. - United States and Canada
FLAMMABLE. - European Union
VAPOR MAY CAUSE FLASH FIRE.

Environmental Hazards : Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Hazardous Material
Information System
(U.S.A.)

Health	1
Fire Hazard	2
Reactivity	0

4. First Aid Measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion : DO NOT induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get immediate medical attention.

Skin Contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Eye Contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-Fighting Measures

Extinguishing Media : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.

Fire-Fighting Procedures : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Fire/Explosion Hazards : COMBUSTIBLE. - United States and Canada FLAMMABLE. - European Union
VAPOR MAY CAUSE FLASH FIRE. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous Decomposition Products : These products are carbon oxides (CO, CO₂).

Flash point : Closed cup: 44°C (111.2°F). (Minimum Pensky-Martens.) Open cup: >51°C (123.8°F) (Cleveland.).

6. Accidental Release Measures

Personal Precautions : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5). Do not touch or walk through spilled material.

Environmental Precautions and Clean-up Methods : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

- Handling** : Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.
- Storage** : Keep container in a well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure Controls and Personal Protection

- Engineering Controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal Protective Equipment**
- Respiratory System** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and Body** : Where contact is likely, wear chemical resistant gloves, a chemical resistant suit, and boots. Additional body garments should be used based upon the task being performed.
- Hands** : Use chemical resistant, impervious gloves.
- Eyes** : Safety goggles are considered minimum protection. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Inгредиент Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Solvent naphtha (petroleum), light aromatic	OSHA (United States). TWA: 500 ppm 8 hour/hours.	OSHA (United States). TWA: 500 ppm 8 hour/hours.	OSHA (United States). TWA: 500 ppm 8 hour/hours.	
2) Benzene, 1,2,4-trimethyl-	ACGIH (United States, 1999). TWA: 25 ppm	TWA: 25 ppm	EH40 (UK) (Europe). TWA: 25 ppm	ACGIH (United States, 1999). TWA: 25 ppm
3) Benzene, 1,3,5-trimethyl-	ACGIH (United States, 1999). TWA: 25 ppm	TWA: 25 ppm	EH40 (UK) (Europe). TWA: 25 ppm	ACGIH (United States, 1999). TWA: 25 ppm
4) Xylene	ACGIH (United States, 1996). TWA: 100 ppm STEL: 150 ppm OSHA (United States). TWA: 100 ppm	TWA: 100 STEL: 150	EH40 (UK) (Europe, 2002). Skin TWA: 50 ppm 8 hour/hours. STEL: 100 ppm 15 minute/minutes.	NOHSC (Australia, 2003). STEL: 80 ppm 15 minute/minutes. STEL: 150 ppm 15 minute/minutes.
5) Cumene	ACGIH (United States, 1994). Skin TWA: 50 ppm OSHA (United States, 1989). Skin TWA: 50 ppm	TWA: 50 ppm	EH40 (UK) (Europe). Skin TWA: 25 ppm 8 hour/hours. TWA: 125 mg/m ³ 8 hour/hours. STEL: 250 mg/m ³ 15 minute/minutes.	NOHSC (Australia, 2003). Skin TWA: 25 ppm 8 hour/hours. STEL: 75 ppm 15 minute/minutes.
6) Benzene, 1,2,3-trimethyl-	ACGIH (United States, 1999). TWA: 25 ppm	TWA: 25 ppm	ACGIH (United States, 1999). TWA: 25 ppm	ACGIH (United States, 1999). TWA: 25 ppm

9. Physical and Chemical Properties

- Physical State and Appearance** : Liquid.
- Color** : Amber. (Light.)
- Odor** : Amine-like. (Slight.)
- Density** : 0.904 g/cm³
- Specific Gravity** : 0.9037 @ 15.6°C
- Viscosity** : 13 cSt @ 40°C
- Auto-Ignition Temperature** : Not determined.
- Flash Point** : Closed cup: 44°C (111.2°F). (Minimum Pensky-Martens.) Open cup: >51°C (123.8°F) (Cleveland.).

10. Stability and Reactivity

- Stability : The product is stable.
- Materials to avoid : Strong oxidizing and reducing agents.
- Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

- Routes of Entry : Skin, Eyes, Ingestion, and Inhalation.
- Target Organs : Contains material which may cause damage to the following organs: blood, kidneys, lungs, liver, heart, gastrointestinal tract, upper respiratory tract, immune system, skin, eyes, central nervous system (CNS).
- Acute Effects
- Inhalation : Irritating to respiratory system.
- Ingestion : Aspiration hazard if swallowed. Can enter lungs and cause damage. Does not meet EU R65 classification criteria.
Ingestion may cause gastrointestinal irritation and diarrhea.
- Skin Contact : Irritating to skin.
- Eye Contact : Irritating to eyes.
- Chronic Effects
- Adverse Effects :
- Adverse symptoms may include: In the presence of slight maternal toxicity, fetotoxic effects have been observed in the offspring of rats exposed by inhalation to Solvent Naphtha (petroleum) light aromatic.
- Adverse symptoms may include: This product contains trimethylbenzene. Literature data indicate that long-term inhalation exposure causes blood effects in laboratory animals.
- Adverse symptoms may include: liver, kidneys, lungs, and heart effects by dermal route and immune system effects by ingestion route.
- Adverse symptoms may include: Central nervous system, liver, kidneys, and blood effects by inhalation and heart beat irregularity (arrhythmia) and heart beat - increase. High exposures to xylene in some animal studies, often at levels toxic to the mother, affected embryo/fetal development. The significance of this finding to humans is not known.
- Carcinogenic Effects : Classified A4 (Not classifiable for humans or animals.) by ACGIH [Xylene].

Toxicity Data

<u>Ingredient Name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Solvent naphtha (petroleum), light aromatic	LD50	8400 mg/kg	Oral	Rat
	LD50	5000 mg/kg	Oral	Rat
Benzene, 1,2,4-trimethyl-	LD50	5000 mg/kg	Oral	Rat
	LC50	18000 mg/m ³ (4 hour/hours)	Inhalation	Rat
Polyolefin	LD50	>34600 mg/kg	Oral	Rat
	LD50	>10250 mg/kg	Dermal	Rabbit
	LC50	>17.3 mg/l (4 hour/hours)	Inhalation	Rat
Benzene, 1,3,5-trimethyl-	LC50	24000 mg/m ³ (4 hour/hours)	Inhalation	Rat
N-Propylbenzene	LD50	6040 mg/kg	Oral	Rat
2-Ethyl hexanol	LD50	2000 to 5000 mg/kg	Oral	Rat
	LD50	2000 to 3800 mg/kg	Oral	Mouse
	LD50	1900 mg/kg	Oral	Guinea pig
	LD50	1970 mg/kg	Dermal	Rabbit
	LC50	>227 ppm (6 hour/hours)	Inhalation	Rat
Xylene	LD50	4300 mg/kg	Oral	Rat
	LD50	>14100 mg/kg	Dermal	Rabbit
	LC50	5000 to 8500 ppm (4 hour/hours)	Inhalation	Rat
Cumene	LD50	1400 mg/kg	Oral	Rat
	LD50	12750 mg/kg	Oral	Mouse
	LD50	10578 mg/kg	Dermal	Rabbit
	LC50	8000 ppm (4 hour/hours)	Inhalation	Rat

Other information : Not available.






12. Ecological Information

Environmental Hazards : Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment. Based on calculation.
Environmental Fate : This product contains components which may be persistent in the environment.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	NA1993	Combustible liquids, n.o.s. (xylene, petroleum distillates)	Combustible liquid.	III		-
TDG Classification	UN1993	FLAMMABLE LIQUIDS, N.O.S. (Xylene, Petroleum distillates)	3	III		-
ADR/RID Class	UN1993	FLAMMABLE LIQUIDS, N.O.S. (Xylene, Petroleum distillates)	3	III		Hazard identification number 30
IMDG Class	UN1993	FLAMMABLE LIQUIDS, N.O.S. (Xylene, Petroleum distillates)	3	III		-
IATA-DGR Class	UN1993	FLAMMABLE LIQUIDS, N.O.S. (Xylene, Petroleum distillates)	3	III		-
ADG Class	UN1993	FLAMMABLE LIQUIDS, N.O.S. (Xylene, Petroleum distillates)	3	III		-

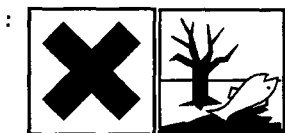
Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Hazard Symbol(s)



Irritant, Dangerous for the environment.

Risk Phrases

: R10- Flammable.
 R36/37/38- Irritating to eyes, respiratory system and skin.
 R67- Vapors may cause drowsiness and dizziness.
 R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases

: S16- Keep away from sources of ignition - No smoking.
 S23- Do not breathe vapor.
 S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
 S57- Use appropriate containment to avoid environmental contamination.

JS Regulations

SARA 313 toxic chemical notification and release reporting

: Benzene, 1,2,4-trimethyl-
 Xylene
 Cumene

10 - 19.9
 1 - 4.9
 1 - 4.9

SARA 311/312 : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: : Fire hazard, Immediate (acute)
Hazardous health hazard, Delayed (chronic) health hazard
Categorization
RQ (Reportable quantity) : .CERCLA: Hazardous substances.; Naphthalene: 100 lbs. (45.36 kg); CUMENE: 5000 lbs. (2268 kg); Xylene: 100 lbs. (45.36 kg); Ethylbenzene: 1000 lbs. (453.6 kg); Benzene: 10 lbs. (4.536 kg)
State - California Prop. 65 : **WARNING:** This product contains chemical/chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.: Naphthalene; Ethylbenzene; Benzene.

Canadian Regulations

WHMIS (Classification) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by _HS&E Department (Tel: +1 804 788 5800) on 11/29/2006.

Date of Printing : 11/29/2006.

☒ Indicates information that has changed from previously issued version.

Notice to Reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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Business Hours: 9:00am - 5:00pm

In Europe:
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Euro-Tech Centre
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RG12 2UW, England
44-1344-304141

In Japan:
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Sumitomo Fudousan Sanbancho Bldg.
5F
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 6431 Fuel Additive

MSDS no.

H6431

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 6560 Fuel Additive

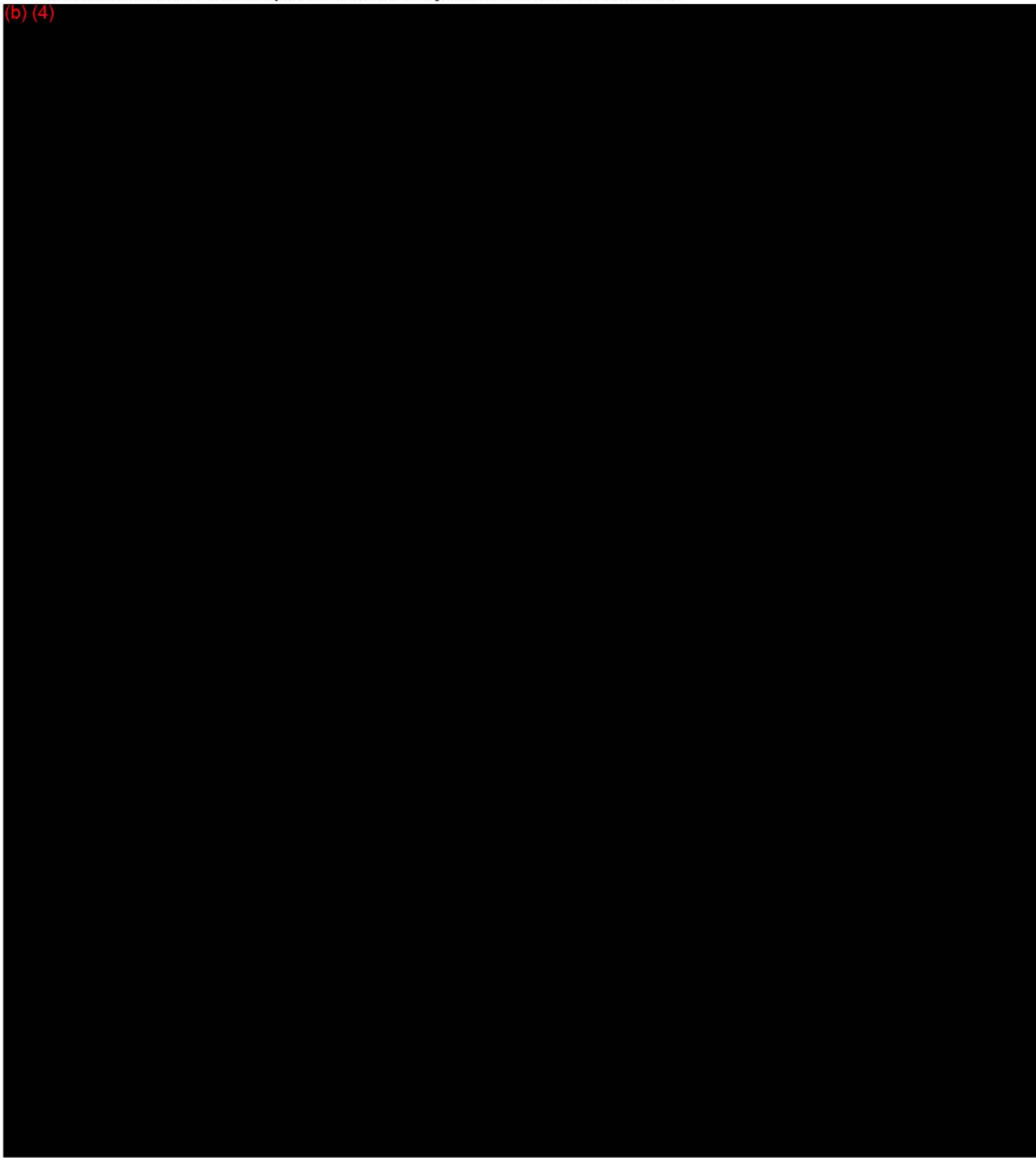
MSDS no.

H6560

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 7012 Performance Additive

MSDS no. H7012

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 7050 Performance Additive

MSDS no. H7050

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Crankcase Additive

Date of issue/Revisions 11 February 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

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Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

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Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

3. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : Decomposition products may include the following materials:
carbon oxides
- Flash point** : Closed cup: 177°C (350.6°F) [Pensky-Martens. Minimum]
Open cup: 212°C (413.6°F) [Cleveland.]

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and body** : Disposable outer garments when there is the potential for contact with the material.
- Hands** : Use chemical resistant, impervious gloves.
- Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Brown. [Dark]
- Odor** : Mineral oil
- Density** : 0.909 g/cm³
- Specific gravity** : 0.910 at 15.6°C (target).
- Viscosity** : 4750 cSt @ 40°C
245 cSt @ 100°C (target).
- Auto-ignition temperature**

Flash point : Not determined.
: Closed cup: 177°C (350.6°F) [Pensky-Martens. Minimum]
Open cup: 212°C (413.6°F) [Cleveland.]

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.
Target organs : None known.
Acute effects
Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion : Not determined.
Skin contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact : Non-irritating to the eyes.
Adverse effects : Not determined.

Carcinogenic effects :

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA	EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.							

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Mineral Oil	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.
Germany water class : 1

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-

IATA-DGR Class	Not regulated.	-	-	-	-	-
ADG Class	Not regulated.	-	-	-	-	-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.
Safety phrases : Not applicable.

Additional warning phrases :

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.
SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.
RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.
State - California Prop. 65 : Does not contain any California Prop 65. chemicals

Canadian regulations

WHMIS (Classification) : Not a WHMIS controlled material.

International Inventory Status

United States inventory (TSCA 8b): All components are listed or exempted.

Canada inventory: All components are listed or exempted.

Europe inventory: All components are listed or exempted.

Japan inventory (ENCS): All components are listed or exempted.

Australia inventory (AICS): All components are listed or exempted.

Korea inventory (KECI): All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 2/11/2008.



Date of printing : 2/11/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are applied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

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Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

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Sumitomo Fudousan Sanbancho Bldg. 5F
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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

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North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***

2937



Material Safety Data Sheet

HiTEC 7160H Performance Additive

MSDS no. H7160H

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

2182

HiTEC 7197 Performance Additive

MSDS no. H7197

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Anti-wear Additive
Date of issue/Revisions 30 June 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
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44 1344-304141
msds@aftonchemical.com

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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
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Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : WARNING!
CAUSES EYE AND SKIN IRRITATION.

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	1
Fire hazard	1
Reactivity	0

GHS Classification

Hazard classification : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B

Symbol :



Signal word : Warning

Hazard statements : Causes skin irritation.
Causes eye irritation.

Precautionary statements

- Prevention** : Wear protective gloves. Wash thoroughly after handling.
- Response** : IF ON SKIN: Take off contaminated clothing and wash before re-use. Wash with plenty of soap and water. If skin irritation occurs, seek medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Wash hands after handling.
- Storage** : Not applicable.
- Disposal** : Not applicable.

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Zinc dialkyl dithiophosphate	68649-42-3	60 - 90	Xi; R36/38	Yes.
Mineral Oil	Mixture.	20 - 30	Not classified.	No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : Some metallic oxides. Hydrogen Sulfide
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]
Open cup: >150°C (>302°F) [Cleveland.]

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- :

- Skin and body** : Where contact is likely, wear chemical resistant gloves, a chemical resistant suit, and boots. Additional body garments should be used based upon the task being performed. Appropriate techniques should be used to remove potentially contaminated clothing.
- Hands** : Hand Protection: Wear chemical resistant gloves. Nitrile gloves of minimum thickness 0.4 mm have an expected breakthrough time of 480 minutes or less when in frequent contact with the product. Due to variable exposure conditions the user must consider that the practical use of a chemical-protective glove in practice may be much shorter than the permeation time above. Manufacturer's directions for use, especially about the minimum thickness and the minimum breakthrough time, must be observed. This information does not replace suitability tests by the end user since glove protection varies depending on the conditions under which the product is used.
- Eyes** : Safety goggles are considered minimum protection. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

Ingredient nameOEL United StatesOEL CanadaOEL EuropeOEL Australia

1) Mineral Oil

ACGIH (United States).

TWA: 5 mg/m³STEL: 10 mg/m³

OSHA (United States).

TWA: 5 mg/m³

(Canada).

TWA: 5 mg/m³STEL: 10 mg/m³

EH40 (UK) (Europe, 2002).

TWA: 5 mg/m³ 8 hour(s).

NOHSC (Australia, 2003).

TWA: 5 mg/m³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Brown.
- Odor** : Sweet. Aromatic.
- Density** : Not determined.
- Specific gravity** : 1.12 at 15.6°C
- Solubility** : Insoluble in the following materials: cold water.
- Viscosity** : 11 cSt at 100°C (target).
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]
Open cup: >150°C (>302°F) [Cleveland.]

10. Stability and reactivity

- Stability** : The product is stable.
- Materials to avoid** : Strong oxidizing and reducing agents.
- Conditions to avoid** : High temperatures, sparks, and open flames.

11. Toxicological information

- Routes of entry** : Skin, Eyes, Ingestion, and Inhalation.
- Target organs** : Contains material which may cause damage to the following organs: gastrointestinal tract, skin, eyes.
- Acute effects**
- Inhalation** : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
- Ingestion** : Ingestion may cause gastrointestinal irritation and diarrhea.
- Skin contact** : Irritating to skin.
- Eye contact** : Irritating to eyes.
- Adverse effects** : Not determined.

Carcinogenic effects :

Product/ingredient name

ACGIH

IARC

EPA

NIOSH

NTP

OSHA

EU

Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name
Not determined

Result

Species

Dose

Exposure

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental fate : This product contains components which may be persistent in the environment.
 Germany water class : 2

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.
 European waste catalogue (EWC) Number : 13-02-05

14. Transport information

Regulatory information	U/N number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

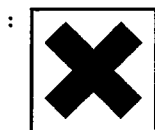
Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Hazard symbol(s)



Irritant

Risk phrases : R36/38- Irritating to eyes and skin.

Safety phrases : S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 S28- After contact with skin, wash immediately with plenty of water.

Contains : Zinc dialkyl dithiophosphate

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : Zinc dialkyl dithiophosphate 60 - 90

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Immediate (acute) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not determined.

International Inventory Status

United States (TSCA) : All components are listed or exempted.
Canada : All components are listed or exempted.
Europe : All components are listed or exempted.
Japan (ENCS) : All components are listed or exempted.
Australia (NICNAS) : All components are listed or exempted.
Korea (ECL) : All components are listed or exempted.
China (IECSC) : All components are listed or exempted.
Philippines (PICCS) : All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HSE Department (Tel: +1 804 788 5800) on 6/30/2008.



Date of printing : 7/1/2008.

Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

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Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudosan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



HITEC 9227 Performance Additive

Material Safety Data Sheet

MSDS No. H9227

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*** END OF MSDS ***



HITEC 9227A Performance Additive

Material Safety Data Sheet

MSDS No. H9227A

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*** END OF MSDS ***

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Material Safety Data Sheet

HiTEC 5708 Performance Additive

MSDS no.

H5708

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 5710A Performance Additive

MSDS no.

H5710A

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 5724 Performance Additive

MSDS NO.

H5724

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

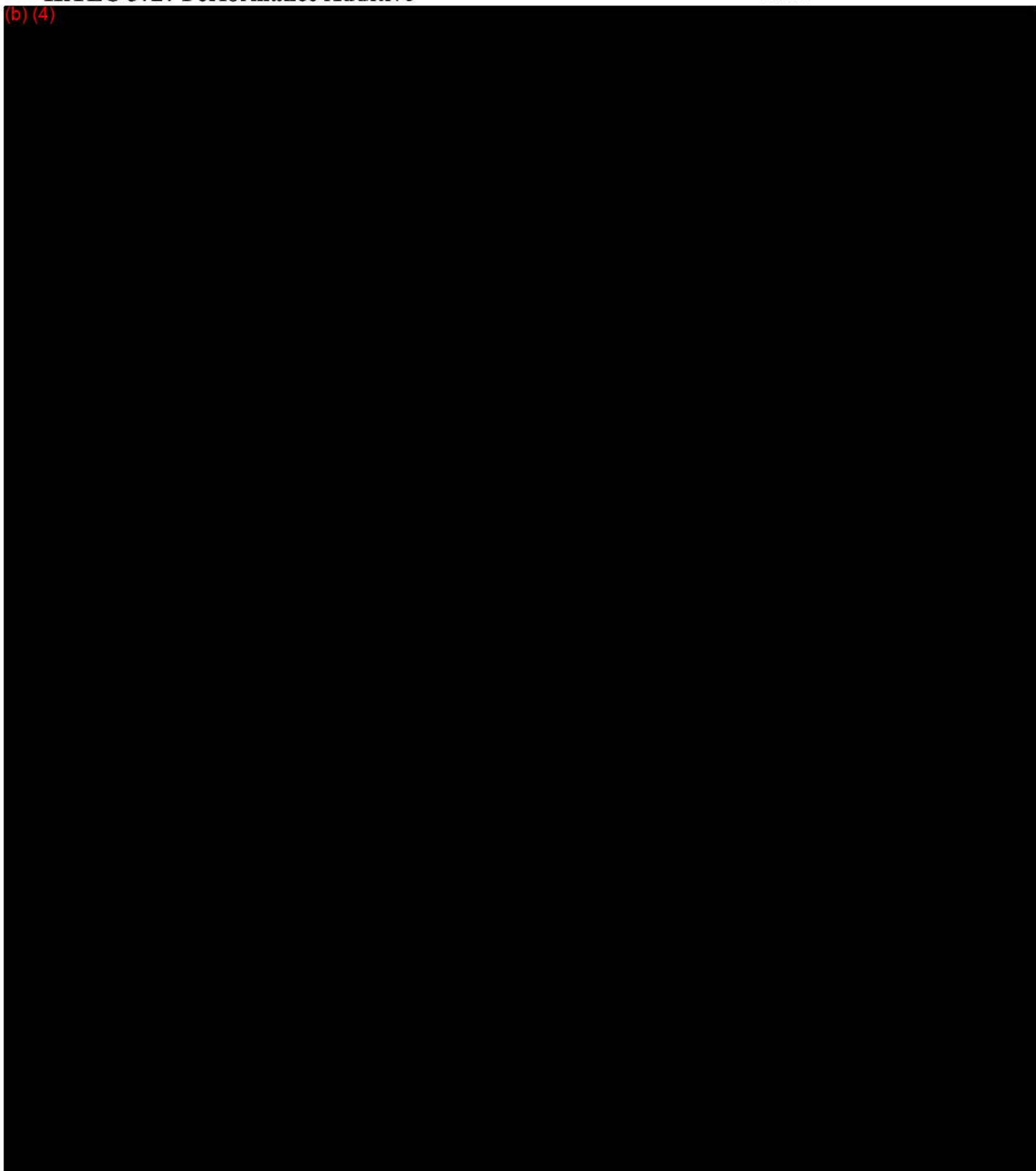
HiTEC 5727 Performance Additive

MSDS no.

H5727

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 5733 Performance Additive

MSDS no. H5733

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*** END OF MSDS ***



HITEC 5736A Performance Additive

Material Safety Data Sheet

MSDS No.

H5736A

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***** END OF MSDS *****



HiTEC 5738 Performance Additive

Material Safety Data Sheet

MSDS No. H5738

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*** END OF MSDS ***



HITEC 5739 Performance Additive

Material Safety Data Sheet

MSDS No.

H5739

HITEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 5755 Performance Additive

MSDS No. H5755

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

Product Use Petrochemical industry: Viscosity Index Improver
Validation Date 11 December 2006

In Case of Emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	60 - 100	Not classified.	No.

3. Hazards Identification

Notice to Reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG Code.

Primary Hazards and Critical Effects : NOTICE!

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(S.A.)

Health	0
Fire Hazard	1
Reactivity	0

4. First Aid Measures

Inhalation	: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion	: If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
Skin Contact	: Wash with soap and water. Get medical attention if irritation develops.
Eye Contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-Fighting Measures

Extinguishing Media	: In case of fire, use water spray (fog), foam, dry chemical, or CO2.
Fire-Fighting Procedures	: Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
Hazardous Decomposition Products	: These products are carbon oxides (CO, CO2)
Flash point	: Closed cup: 135°C (275°F). (Pensky-Martens. Minimum) Open cup: >150°C (302°F) (Cleveland.).

6. Accidental Release Measures

Personal Precautions	: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
Environmental Precautions and Clean-up Methods	: If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

Handling	: Wash thoroughly after handling.
Storage	: Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls and Personal Protection

Engineering Controls	: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Personal Protective Equipment	
Respiratory System	: Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
Skin and Body	: Disposable outer garments when there is the potential for contact with the material.
Hands	: Use chemical resistant, impervious gloves.
Eyes	: Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Ingredient Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour/hours.	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour/hours.

9. Physical and Chemical Properties

Physical State and Appearance	: Liquid.
Color	: Pale color.
Odor	: Petroleum.
Density	: 0.864 g/cm ³
Specific Gravity	: 0.866 at 15.6°C (typical).
Solubility	:
Viscosity	: 11000 cSt @ 40°C

1240 cSt at 100°C (typical).
Auto-Ignition Temperature : Not determined.
Flash Point : Closed cup: 135°C (275°F). (Pensky-Martens. Minimum) Open cup: >150°C (302°F) (Cleveland.).

Stability and Reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : Skin, Eyes, Ingestion, and Inhalation.

Target Organs : None known.

Acute Effects

Inhalation :
Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Not determined.

Skin Contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact : Non-irritating to the eyes.

Chronic Effects

Adverse Effects : Not determined.

Toxicity Data

<u>Inгредиент Name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
HITEC 5755 Performance Additive	LD50	>2000 mg/kg	Dermal	Rabbit

Other information : Not available.

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental Fate : This product contains components which may be persistent in the environment.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Risk Phrases : This product is not classified according to the EU regulations.
Safety Phrases : Not applicable.

Additional warning phrases :

US Regulations

SARA 313 toxic chemical notification and release reporting : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) : ☒

State - California Prop. 65 : ☒ This product contains chemical/chemicals known to the state of California to cause reproductive harm (female).: No products were found.

Canadian Regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by _HS&E Department (Tel: +1 804 788 5800) on 12/11/2006.

Date of Printing : 12/20/2006.

☒ Indicates information that has changed from previously issued version.

Notice to Reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.

ADDRESS CONTACT INFORMATION

In the United States and Canada:
Afton Chemical Corporation
500 Spring Street
Richmond, Virginia
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Telephone number: 804-788-5800

In Europe:
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Euro-Tech Centre
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RG12 2UW, England
44-1344-304141

In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg.
5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 5777 Performance Additive

MSDS no. H5777

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

HiTEC 5777D Performance Additive

MSDS no. H5777D

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***** END OF MSDS *****



Material Safety Data Sheet

HiTEC 6130 Performance Additive

MSDS no. H6130

HiTEC is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Diesel Oil Treatment Package

Date of issue/Revisions 28 April 2008

In case of emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

Europe: The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Australia: NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.

Primary hazards and critical effects : NOTICE!

Environmental hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material Information System (U.S.A.)

Health	0
Fire hazard	1
Reactivity	0

3. Composition/Information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS no.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.

4. First aid measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

- Extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-fighting procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]

6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental precautions and clean-up methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
- Skin and body** : Disposable outer garments when there is the potential for contact with the material.
- Hands** : Use chemical-resistant, impervious gloves.
- Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	(Canada). TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. [Viscous liquid.]
- Color** : Amber. [Dark]
- Odor** : Mild. Petroleum.
- Specific gravity** : 0.92 @ 15.6°C (target)
- Solubility** : Insoluble in the following materials: cold water.
- Viscosity** : 7120 cSt at 40°C
230 cSt @ 100°C (target)
- Flash point** : Closed cup: 110°C (230°F) [Pensky-Martens. Minimum]

10. Stability and reactivity

Stability : The product is stable.
Materials to avoid : Strong oxidizing and reducing agents.
Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological information

Routes of entry : Skin, Eyes, Ingestion, and Inhalation.
Target organs : None known.
Acute effects
Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion : Not determined.
Skin contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
Eye contact : Non-irritating to the eyes.
Adverse effects : Not determined.

Product/ingredient name ACGIH IARC EPA NIOSH NTP OSHA EU
Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Not determined.				

Other information : Not available.

12. Ecological information

Environmental hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
ATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Not available.

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Risk phrases : This product is not classified according to EU legislation.

Safety phrases : Not applicable.

Additional warning phrases :

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 Nuisance Mist/Dust Only

RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States inventory (TSCA 8b): All components are listed or exempted.

Canada inventory: All components are listed or exempted.

Europe inventory: All components are listed or exempted.

Japan inventory (ENCS): All components are listed or exempted.

Australia inventory (AICS): All components are listed or exempted.

Korea inventory (KECI): All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 4/28/2008.



Date of printing : 4/28/2008.

Indicates information that has changed from previously issued version.

Notice to reader

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ADDRESS CONTACT INFORMATION

In the United States and Canada:
Afton Chemical Corporation
500 Spring Street
Richmond, Virginia
USA 23219-2183
Telephone number: 804-788-5800

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Singapore:

111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

***** END OF MSDS *****

Tecguard



Material Safety Data Sheet

MSDS No.

TecGARD 235

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

Product Use Petrochemical industry: Metalworking fluid

Validation Date 10 May 2006

In Case of Emergency

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141

In Japan:

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6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient Name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	20-30	Not controlled under DSD (Europe).	No.

3. Hazards Identification

Notice to Reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Primary Hazards and Critical Effects : NOTICE!

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(U.S.A.)

Health	0
Fire Hazard	1
Reactivity	0

4. First Aid Measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin Contact** : Wash with soap and water. Get medical attention if irritation occurs.
- Eye Contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-Fighting Measures

- Extinguishing Media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-Fighting Procedures** : Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous Decomposition Products** : These products are carbon oxides (CO, CO₂).
- Flash point** : Closed cup: 140°C (284°F).

6. Accidental Release Measures

- Personal Precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Follow all fire fighting procedures (Section 5).
- Environmental Precautions and Clean-up Methods** : If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls and Personal Protection

- Engineering Controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal Protective Equipment**
- Respiratory System** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and Body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Ingrdient Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and Chemical Properties

- Physical State and Appearance** : Liquid. (Amber to brown)
- Odor** : Pungent. (Slight.)
- Specific Gravity** : 0.926°15.6C
- Viscosity** : 3576 cSt @ 40°C
- Viscosity** : 86 cSt @ 100°C
- Flash Point** : Closed cup: 140°C (284°F).

10. Stability and Reactivity

Stability : The product is stable.

Materials to avoid : Strong oxidizing and reducing agents.

Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : Skin, Eyes, Inhalation and Ingestion.

Target Organs : Not available.

Acute Effects

Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Not determined.

Skin Contact : Non-irritating to the skin. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact : Non-irritating to the eyes.

Chronic Effects

Carcinogenic Effects :

Toxicity Data

<u>Ingredient Name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

Other Information : Not available.

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental Fate : This product contains components which may be persistent in the environment.

Germany water class : Not determined.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	Not regulated.	-	-			-
TDG Classification	Not regulated.	-	-			
ADR/RID Class	Not regulated.	-	-			-
IMDG Class	Not regulated.	-	-			-
IATA-DGR Class	Not regulated.	-	-			-
ADG Class	Not regulated.	-	-			-

Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Risk Phrases : This product is not classified according to the EU regulations.

Safety Phrases : Not applicable.

US Regulations : No SARA 313 chemicals are present above the reporting threshold.

: SARA 311/312 Nuisance Mist/Dust Only

State : California prop. 65: No products were found.

Canadian Regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States : All components on TSCA Inventory

Canada : All components on DSL

Europe : All components on EINECS

Japan : All components on METI

Australia : All components on NICNAS

Korea : All components on ECL

China : All components on IECSC

Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by _HIS&E Department (Tel: +1 804 788 5800) on 5/10/2006.

Version : 1.00

Date of Printing : 5/10/2006.

☑ Indicates information that has changed from previously issued version.

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In Singapore:

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111 Somerset Road
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Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Europe:

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RG12 2UW, England
44-1344-304141

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



Material Safety Data Sheet

MSDS No. TecGARD 236

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and Company Identification

Product Use Petrochemical industry: Metalworking Fluid

Validation Date 13 April 2006

In Case of Emergency

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141

In Japan:

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Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient Name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	10-19.9	Not controlled under DSD (Europe).	No.

3. Hazards Identification

Notice to Reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

This product is not classified as hazardous according to the criteria of NOHSC (Australia).

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Primary Hazards and Critical Effects : NOTICE!

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(U.S.A.)

Health	0
Fire Hazard	1
Reactivity	0

4. First Aid Measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin Contact** : Wash with soap and water. Get medical attention if irritation occurs.
- Eye Contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-Fighting Measures

- Extinguishing Media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-Fighting Procedures** : Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous Decomposition Products** : These products are carbon oxides (CO, CO₂).
- Flash point** : Closed cup: 140°C (284°F) (Pensky-Martens. Minimum)

6. Accidental Release Measures

- Personal Precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Follow all fire fighting procedures (Section 5).
- Environmental Precautions and Clean-up Methods** : If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) scoop up material and place in a sealed, liquid-proof container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls and Personal Protection

- Engineering Controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal Protective Equipment**
- Respiratory System** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and Body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Inгредиент Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour(s).	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour(s).

9. Physical and Chemical Properties

- Physical State and Appearance** : Liquid. (Amber to brown.)
- Odor** : Pungent. (Slight.)
- Specific Gravity** : 0.926 @ 15.6/15.6°C
- Viscosity** : 15137 cSt @ 40°C
- Viscosity** : 250 cSt @ 100°C
- Flash Point** : Closed cup: 140°C (284°F) (Pensky-Martens. Minimum)

10. Stability and Reactivity

Stability : The product is stable.
 Materials to avoid : Strong oxidizing and reducing agents.
 Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : Skin, Eyes, Inhalation and Ingestion.
 Target Organs : None known.

Acute Effects

Inhalation : Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
 Ingestion : Not determined.
 Skin Contact : Non-irritating to the skin. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.
 Eye Contact : Non-irritating to the eyes.

Chronic Effects

Carcinogenic Effects : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity Data

<u>Ingredient Name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

Other Information : Not available.

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.
 Environmental Fate : This product contains components which may be persistent in the environment.
 Germany water class : Not determined.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	Not regulated.	-	-			-
TDG Classification	Not regulated.	-	-			
ADR/RID Class	Not regulated.	-	-			-
IMDG Class	Not regulated.	-	-			-
IATA-DGR Class	Not regulated.	-	-			-
ADG Class	Not regulated.	-	-			-

Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Risk Phrases : This product is not classified according to the EU regulations.
Safety Phrases : Not applicable.
Additional Warning Phrases : Not applicable.

US Regulations : No SARA 313 chemicals are present above the reporting threshold.
: SARA 311/312 Nuisance Mist/Dust Only
State : California prop. 65: No products were found.

Canadian Regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by _HIS&E Department (Tel: +1 804 788 5800) on 4/13/2006.

Version : 1.00

Date of Printing : 4/13/2006.

☒ Indicates information that has changed from previously issued version.

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ADDRESS CONTACT INFORMATION

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Afton Chemical Corporation
500 Spring Street
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USA 23219-2183
Telephone number: 804-788-5800

In Singapore:

Afton Chemical Asia Pacific Company
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Europe:

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

***** END OF MSDS *****



Material Safety Data Sheet

TecGARD 250

MSDS no.

TecGARD 250

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

TecGARD 260A

MSDS no.

TecGARD 260A

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

TecGARD 265

MSDS No. TecGARD 265

2937

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Comb.



Material Safety Data Sheet

TecGARD 530

MSDS no. TecGARD 530

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***



Material Safety Data Sheet

TecGARD 740

MSDS no. TecGARD 740

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

1. Product and company identification

Product use Petrochemical industry: Gear Oil Additive
NOT SUITABLE FOR METALWORKING FLUID APPLICATIONS
Date of issue/Revisions 27 August 2007

In case of emergency - Chemical

1-800-403-0044 (US & Canada)
1-804-648-7727 (International)
32-2-507-20-64 (Europe)
81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141
msds@aftonchemical.com

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudosan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Hazards identification

Notice to reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 2 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Sections 3 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classified as hazardous according to the criteria of NOHSC and not classified as dangerous goods according to the ADG Code.

Primary hazards and critical effects : WARNING!
CAUSES RESPIRATORY TRACT AND EYE IRRITATION.
Physical/chemical hazards : COMBUSTIBLE. - United States and Canada
VAPOR MAY CAUSE FLASH FIRE.

Environmental hazards : Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Hazardous Material
Information System
(U.S.A.)

Health	1
Fire hazard	2
Reactivity	0

3. Composition and information on ingredients

Note: see section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

Ingredient name

CAS no.

Conc. (% w/w) EU Classification

WHMIS
Regulated?

EPAPA005000524

Mineral Oil	Mixture.	10 - 19.9	Not classified.	No.
Long-chain alkyl amine	proprietary	5 - 9.9	T; R23/24 Xn; R22, R48/20 C; R34 R43 N; R50/53 Xi; R38, R41 N; R51/53	Yes.**
Alkyl Phosphonate	proprietary	1 - 4.9	C; R34 Xi; R37	Yes.**
Alkyl phosphate I	proprietary	1 - 4.9	C; R34 Xi; R37	Yes.**
Alkyl phosphate II	proprietary	1 - 4.9	C; R34 Xi; R37	Yes.**
Long-chain alkenyl amine	proprietary	1 - 4.9	Xn; R22 C; R35 N; R50	Yes.**

Notice to reader

These products take place in a complex neutralization process.

4. First aid measures

Inhalation	: If inhaled, remove to fresh air. If not breathing, immediately get medical attention and begin mouth-to-mouth resuscitation and/or cardiopulmonary resuscitation if needed.
Ingestion	: If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. If not breathing, immediately get medical attention and begin mouth-to-mouth resuscitation and/or cardiopulmonary resuscitation if needed.
Eye contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media	: In case of fire, use water spray (fog), foam, dry chemical, or CO2.
Fire-fighting procedures	: Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
Fire/explosion hazards	: COMBUSTIBLE. - United States and Canada VAPOR MAY CAUSE FLASH FIRE. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
Hazardous decomposition products	: These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...), sulfur oxides (SO2, SO3...), phosphates.
Flash point	: Closed cup: 83°C (181.4°F). (Pensky-Martens. Minimum)

6. Accidental release measures

Personal precautions	: Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5). Do not touch or walk through spilled material.
Environmental precautions and clean-up methods	: If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling	: Do not ingest. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.
Storage	: Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure controls and personal protection

- Engineering controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal protective equipment**
- Respiratory system** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety goggles are considered minimum protection. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational exposure limits

<u>Ingredient name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour/hours.	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour/hours.

9. Physical and chemical properties

- Physical state and Appearance** : Liquid. (Clear amber liquid with characteristic odor.)
- Odor** : Pungent. (Slight.)
- Specific gravity** : 1.044 at 15.6/15.6°C (target).
- Solubility** :
- Viscosity** : 9 cSt at 100°C (target).
- Flash point** : Closed cup: 83°C (181.4°F). (Pensky-Martens. Minimum)

10. Stability and reactivity

- Stability** : The product is stable.
- Materials to avoid** : Strong oxidizing and reducing agents.
- Conditions to avoid** : High temperatures, sparks, and open flames.

11. Toxicological information

- Routes of entry** : Skin, Eyes, Ingestion, and Inhalation.
- Target organs** : Contains material which may cause damage to the following organs: upper respiratory tract, eyes.

Acute effects

- Inhalation** : Irritating to respiratory system.
Does not meet EU R37 classification criteria.
- Ingestion** : Not determined.
- Skin contact** : Non-irritating to the skin. Not classified as a skin sensitizer. Based on test data for this or similar products.
- Eye contact** : Irritating to eyes. Based on test data for this or similar products.

- Adverse effects** : Not determined.

- Carcinogenic effects** : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Olefin sulfide	LD50	8600 mg/kg	Oral	Rat
	LD50	20000 mg/kg	Dermal	Rabbit
	LD50	>500 mg/kg	Oral	Rat
	LD50	201 to 1000 mg/kg	Dermal	Rabbit
	LC50	150 - 1500 ppm (4 hr.)	Inhalation	Rat
Alkyl Phosphonate	LD50	> 2000 mg/kg	Oral	Rat
	LD50	1000 - 2000 mg/kg	Dermal	Rabbit
Alkyl phosphate I	LD50	>500 mg/kg	Oral	Rat
	LD50	>1000 mg/kg	Dermal	Rabbit
Alkyl dithio thiadiazole	LD50	>10000 mg/kg	Oral	Rat

	LD50	>2000 mg/kg	Dermal	Rabbit
	LC50	>2.75 mg/l (4 hour/hours)	Inhalation	Rat
Alkyl phosphate II	LD50	>500 mg/kg	Oral	Rat

12. Ecological information

Environmental hazards : Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment. Based on calculation.
Environmental fate : This product contains components which may be persistent in the environment.

13. Disposal considerations

Waste handling and disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	NA1993	Combustible liquid, n.o.s. (sulfurized olefin).	Combustible liquid.	III		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

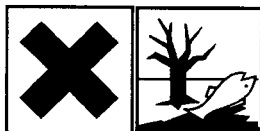
Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory information

EU regulations

Hazard symbol(s) :



Irritant, Dangerous for the environment.

Risk phrases

: R36- Irritating to eyes.
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

: S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S57- Use appropriate containment to avoid environmental contamination.

Contains

: Long-chain alkyl amine
Long-chain alkenyl amine

Additional warning phrases

: Contains Long-chain alkyl amine. May produce an allergic reaction.

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: : Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances. 2-Propenoic acid ethyl ester 1000 lbs. (453 kg):

State - California Prop. 65 : California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:
2-PROPENOIC ACID, ETHYL ESTER

Canadian regulations

WHMIS (Classification) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2B: Material causing other toxic effects (Toxic).
D-1B Material causing immediate and serious toxic effects (Toxic).
**Any WHMIS regulated ingredients marked as proprietary are done so under the auspices of the Hazardous Materials Information Review Commission. These ingredients take part in a complex neutralization process leading to a WHMIS regulated reaction product.

HMIRC Registry Number : 6118

Claim granted. : December 17, 2004

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other information

PREPARATION INFORMATION

Validated by HS&E Department (Tel: +1 804 788 5800) on 8/27/2007.



Date of printing : 8/27/2007.

Indicates information that has changed from previously issued version.

Notice to reader

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In Singapore:
111 Somerset Road
#09-05
Singapore Power Building
Singapore 238164
Telephone number: 65-6732-0822

In Australia:
Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

In Europe:
Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44-1344-304141

In Japan:
Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg.
5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

*** END OF MSDS ***



Material Safety Data Sheet

TecGARD 760

MSDS No. TecGARD 760

TecGARD is a trademark owned by Afton Chemical Corporation or one of its subsidiaries.

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*** END OF MSDS ***

Misc



Material Safety Data Sheet

X 15764

MSDS No. X 15764

1. Product and Company Identification

Product Use Petrochemical industry: Dispersant

Validation Date 18 July 2006

In Case of Emergency - Chemical

1-800-403-0044 (US & Canada)

1-804-648-7727 (International)

32-2-507-20-64 (Europe)

81-3-5210-4890 (Japan)

Manufacturer / Supplier

Afton Chemical Corporation
500 Spring St.
Richmond, VA 23219
1-804-788-5800

Afton Chemical Limited
Euro-Tech Centre
London Road, Bracknell, Berkshire
RG12 2UW, England
44 1344-304141

In Japan:

Afton Chemical Japan Corporation
Sumitomo Fudousan Sanbancho Bldg. 5F
6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company
Level 9, 20 Berry Street
North Sydney, NSW 2060
Australia
Telephone number: 02-9923-1588
Business Hours: 9:00am - 5:00pm

2. Composition and Information on Ingredients

Note: See section 8 for occupational exposure limits and section 11 for LC50/LD50 information.

Substance/Preparation : Preparation

<u>Ingredient name</u>	<u>CAS No.</u>	<u>Conc. (% w/w)</u>	<u>EU Classification</u>	<u>WHMIS Regulated?</u>
Mineral Oil	Mixture.	30 - 60	Not classified.	No.

3. Hazards Identification

Notice to Reader

Afton operates a world-wide system for hazard communication. Some hazards shown in Section 3 may apply to non-EU countries and may not result in classification and labeling in the EU. Please see Section 2 and 15 for country specific classification information, and Section 11 for additional details.

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG Code.

Primary Hazards and Critical Effects : NOTICE!

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria.

Hazardous Material
Information System
(U.S.A.)

Health	1
Fire Hazard	1
Reactivity	0

EPAPA005000536

4. First Aid Measures

- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
- Ingestion** : If affected person is fully conscious, give one glass of water to drink. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Skin Contact** : Wash with soap and water. Get medical attention if irritation develops.
- Eye Contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

5. Fire-Fighting Measures

- Extinguishing Media** : In case of fire, use water spray (fog), foam, dry chemical, or CO₂.
- Fire-Fighting Procedures** : Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.
- Hazardous Decomposition Products** : These products are carbon oxides (CO, CO₂).
- Flash point** : Closed cup: >140°C (284°F). (Pensky-Martens. Minimum)

6. Accidental Release Measures

- Personal Precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Follow all fire-fighting procedures (section 5).
- Environmental Precautions and Clean-up Methods** : If emergency personnel are unavailable, contain spilled material. For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal. Minimize contact of spilled material with soils to prevent runoff to surface waterways.

Note: See section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and Storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure Controls and Personal Protection

- Engineering Controls** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- Personal Protective Equipment**
- Respiratory System** : Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s).
 - Skin and Body** : Disposable outer garments when there is the potential for contact with the material.
 - Hands** : Use chemical resistant, impervious gloves.
 - Eyes** : Safety glasses with side shields. Goggles with a face shield may be necessary depending on quantity of material and conditions of use.

Occupational Exposure Limits

<u>Ingredient Name</u>	<u>OEL United States</u>	<u>OEL Canada</u>	<u>OEL Europe</u>	<u>OEL Australia</u>
1) Mineral Oil	ACGIH (United States). TWA: 5 mg/m ³ STEL: 10 mg/m ³ OSHA (United States). TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	EH40 (UK) (Europe, 2002). TWA: 5 mg/m ³ 8 hour/hours.	NOHSC (Australia, 2003). TWA: 5 mg/m ³ 8 hour/hours.

9. Physical and Chemical Properties

- Physical State and Appearance** : Liquid. (Viscous liquid.)
- Color** : Brown. (Dark.)
- Density** : Not determined.
- Specific Gravity** : 0.905 at 15.6°C
- Solubility** : Insoluble in cold water.
- Viscosity** : 660 cSt @ 100°C
- Auto-Ignition Temperature** : Not determined.

Flash Point : Closed cup: >140°C (284°F). (Pensky-Martens. Minimum)

10. Stability and Reactivity

Stability : The product is stable.

Materials to avoid : Strong oxidizing and reducing agents.

Conditions to avoid : High temperatures, sparks, and open flames.

11. Toxicological Information

Routes of Entry : Skin, Eyes, Inhalation, and, Ingestion.

Target Organs : None known.

Acute EffectsInhalation :
Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Ingestion : Not determined.

Skin Contact :
Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin, resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact : Non-irritating to the eyes.

Chronic Effects

Adverse Effects : Not determined.

Toxicity Data

<u>Ingredient Name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Not determined.				

12. Ecological Information

Environmental Hazards : Not classified as dangerous for the environment according to EC criteria. Based on calculation.

Environmental Fate : This product contains components which may be persistent in the environment.

13. Disposal Consideration

Waste Handling and Disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
ADR/RID Class	Not regulated.	-	-	-		-
IMDG Class	Not regulated.	-	-	-		-
IATA-DGR Class	Not regulated.	-	-	-		-
ADG Class	Not regulated.	-	-	-		-

Notice to Reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

15. Regulatory Information

EU Regulations

Risk Phrases : This product is not classified according to EU legislation.
Safety Phrases : Not applicable.

US Regulations

SARA 313 toxic chemical notification and release reporting : No SARA 313 chemicals are present above the reporting threshold.
SARA 311/312 Hazardous Categorization : SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.
RQ (Reportable quantity) : CERCLA: Hazardous substances.: No products were found.

State - California Prop. 65 : No products were found.

Canadian Regulations

WHMIS (Classification) : Not controlled under WHMIS (Canada).

International Inventory Status

United States : All components on TSCA Inventory
Canada : All components on DSL
Europe : All components on EINECS
Japan : All components on METI
Australia : All components on NICNAS
Korea : All components on ECL
China : All components on IECSC
Philippines : All components on PICCS

16. Other Information

PREPARATION INFORMATION

Validated by _HS&E Department (Tel: +1 804 788 5800) on 7/18/2006.

Date of Printing : 7/18/2006.

☒ Indicates information that has changed from previously issued version.

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6-26 Sanbancho, Chiyoda-ku
Tokyo 102-0075 Japan
Emergency phone: 81-3-5210-4890

In Australia:

Afton Chemical Asia Pacific Company

Level 9, 20 Berry Street

North Sydney, NSW 2060

Australia

Telephone number: 02-9923-1588

Business Hours: 9:00am - 5:00pm

*** END OF MSDS ***



ETHANOX 323A

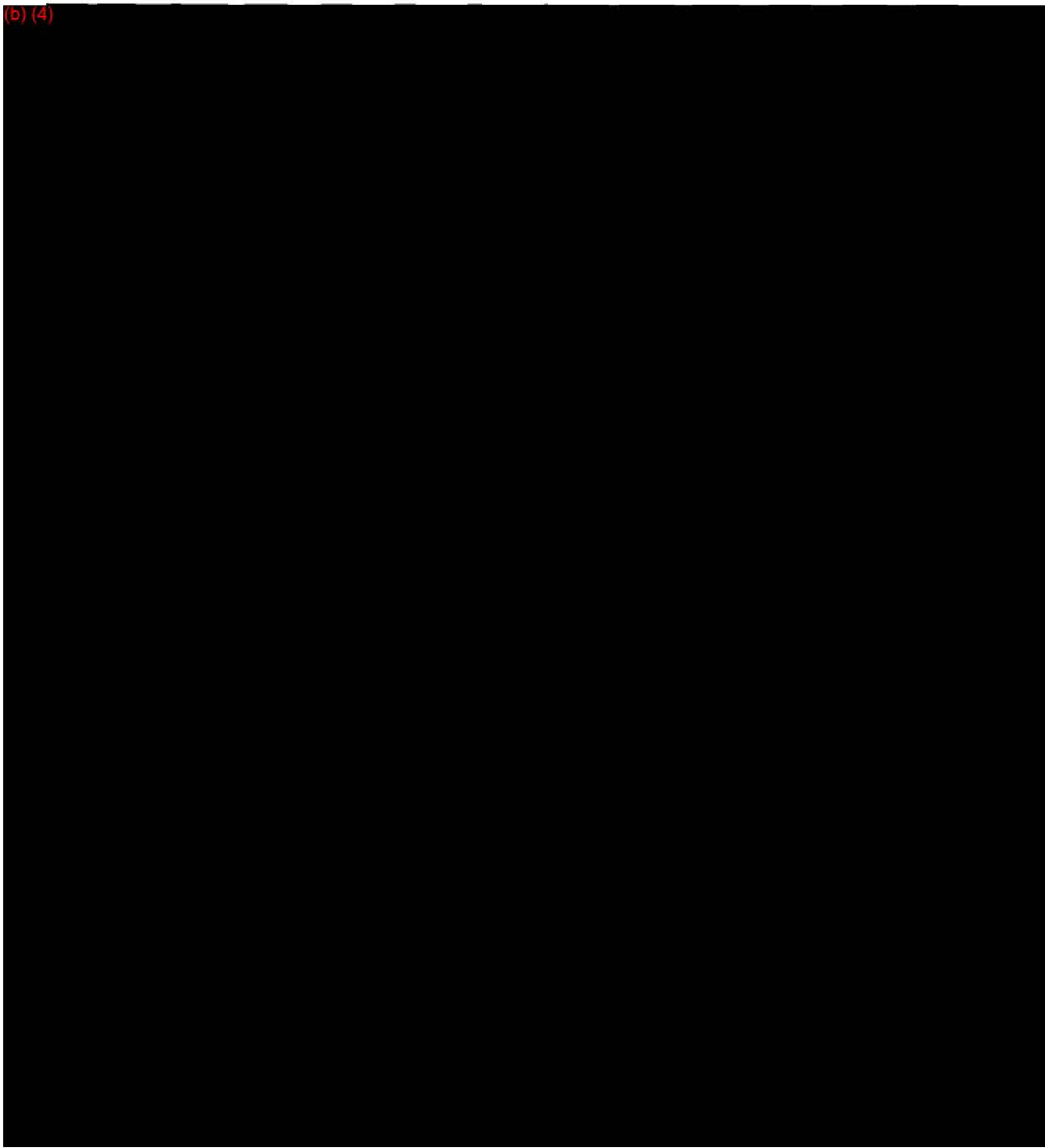
Material Safety Data Sheet

MSDS no.

E323A

2981

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*** END OF MSDS ***

Material Safety Data Sheets

A-G

MSDS

A

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 07/13/2006
Date Updated: 02/05/2006
Version 1.5

Section 1 - Product and Company Information

Product Name ACETAL, 99%
Product Number A902
Brand ALDRICH

Company Sigma-Aldrich
Address 3050 Spruce Street
SAINT LOUIS MO 63103 US
Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
ACETAL	105-57-7	No

Formula C6H14O2
Synonyms Acetaal (Dutch) * Acetal * Acetal diethylique
(French) * Acetale (Italian) *
1,1-Diaethoxy-aethan (German) * Diaethylacetal
(German) * 1,1-Diethoxy-ethaan (Dutch) *
1,1-Diethoxyethane * Diethyl acetal *
1,1-Dietossietano (Italian) * Ethane,
1,1-diethoxy- * Ethylidene diethyl ether * USAF
DO-45
RTECS Number: AB2800000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Irritant.
May form explosive peroxides. Irritating to eyes and skin.

HMIS RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 1

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 1

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is
conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS

Flammable Hazards: Yes
Peroxide Former: Yes

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT

- 5.8 °F - 21.0 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1.65 % Upper: 10.4 %

AUTOIGNITION TEMP

230 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.
Unsuitable: Do not use water.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

SPECIAL REQUIREMENTS

Heat-, light-, and moisture-sensitive. Do not distill to dryness.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless	
Property	Value	At Temperature or Pressure
Molecular Weight	118.18 AMU	
pH	N/A	
BP/BP Range	100.0 - 103.0 °C	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	20 mmHg	20 °C
Vapor Density	4.1 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.826 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	- 5.8 °F - 21.0 °C Method: closed cup	
Explosion Limits	Lower: 1.65 %	

	Upper: 10.4 %
Flammability	N/A
Autoignition Temp	230 °C
Refractive Index	1.381
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions of Instability: May form peroxides on prolonged storage. Date container and periodically test for peroxides.

Conditions to Avoid: Light. Heat. Moisture.

Materials to Avoid: Strong oxidizing agents, Strong reducing agents, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes eye irritation.

Inhalation: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

Exposure can cause: CNS depression. Gastrointestinal disturbances. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral

Rat

4600 mg/kg

LD50

Intraperitoneal

Rat

900 MG/KG

LD50

Oral

Mouse

3500 mg/kg

LD50

Intraperitoneal

Mouse

500 MG/KG
LD50

Oral
Rabbit
3545 mg/kg
LD50

IRRITATION DATA

Skin
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Section 12 - Ecological Information

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Acetal
UN#: 1088
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Acetal
IATA UN Number: 1088
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: F-Xi
Indication of Danger: Highly Flammable. Irritant.
R: 11-36/38
Risk Statements: Highly flammable. Irritating to eyes and skin.
S: 9-16-33
Safety Statements: Keep container in a well-ventilated place.
Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU).
Irritant.
Risk Statements: May form explosive peroxides. Irritating to eyes and skin.
Safety Statements: Keep away from sources of ignition - no

smoking. Do not empty into drains. Take precautionary measures against static discharges. Keep container tightly closed in a cool well-ventilated place.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.



Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
(425) 889-3400

G-4001

For Emergency Assistance involving chemicals call - CHEMTREC (800) 424-9300

The Version Date and Number for this MSDS is : 04/13/2007 - #008

PRODUCT NAME: ACETONE
MSDS NUMBER: MZA0446
DATE ISSUED: 04/11/2007
SUPERSEDES: 08/04/2004
ISSUED BY: 008614

PRODUCT NAME:
ACETONE

Distributed by:
Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
425-889-3400

ACETONE

1. PRODUCT IDENTIFICATION

SYNONYMS: DIMETHYLKETONE; 2-PROPANONE; DIMETHYLKETAL
CAS NO: 67-64-1
MOLECULAR WEIGHT: 58.08
CHEMICAL FORMULA: (CH₃)₂CO

Distributed by:
Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
425-889-3400

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	CAS NO	PERCENT	HAZARDOUS
ACETONE	67-64-1	99 - 100%	YES

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

POTENTIAL HEALTH EFFECTS

INHALATION:

INHALATION OF VAPORS IRRITATES THE RESPIRATORY TRACT. MAY CAUSE COUGHING, DIZZINESS, DULLNESS, AND HEADACHE. HIGHER CONCENTRATIONS CAN PRODUCE CENTRAL NERVOUS SYSTEM DEPRESSION, NARCOSIS, AND UNCONSCIOUSNESS.

INGESTION:

SWALLOWING SMALL AMOUNTS IS NOT LIKELY TO PRODUCE HARMFUL EFFECTS. INGESTION OF LARGER AMOUNTS MAY PRODUCE ABDOMINAL PAIN, NAUSEA AND VOMITING. ASPIRATION INTO LUNGS CAN PRODUCE SEVERE LUNG DAMAGE AND IS A MEDICAL EMERGENCY. OTHER SYMPTOMS ARE EXPECTED TO PARALLEL INHALATION.

SKIN CONTACT:

IRRITATING DUE TO DEFATTING ACTION ON SKIN. CAUSES REDNESS, PAIN, DRYING AND CRACKING OF THE SKIN.

EYE CONTACT:

VAPORS ARE IRRITATING TO THE EYES. SPLASHES MAY CAUSE SEVERE IRRITATION, WITH STINGING, TEARING, REDNESS AND PAIN.

CHRONIC EXPOSURE:

PROLONGED OR REPEATED SKIN CONTACT MAY PRODUCE SEVERE IRRITATION OR DERMATITIS.

AGGRAVATION OF PRE-EXISTING CONDITIONS:

USE OF ALCOHOLIC BEVERAGES ENHANCES TOXIC EFFECTS. EXPOSURE MAY INCREASE THE TOXIC POTENTIAL OF CHLORINATED HYDROCARBONS, SUCH AS CHLOROFORM, TRICHLOROETHANE.

4. FIRST AID MEASURES

INHALATION:

REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET MEDICAL ATTENTION.

INGESTION:

ASPIRATION HAZARD. IF SWALLOWED, VOMITING MAY OCCUR SPONTANEOUSLY, BUT DO NOT INDUCE. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION INTO LUNGS. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. CALL A PHYSICIAN IMMEDIATELY.

SKIN CONTACT:

IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. REMOVE

CONTAMINATED CLOTHING AND SHOES. GET MEDICAL ATTENTION. WASH CLOTHING BEFORE REUSE. THOROUGHLY CLEAN SHOES BEFORE REUSE.

EYE CONTACT:

IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES, LIFTING UPPER AND LOWER EYELIDS OCCASIONALLY. GET MEDICAL ATTENTION.

=====

5. FIRE FIGHTING MEASURES

FIRE:

FLASH POINT: -20C (-4F) CC

AUTOIGNITION TEMPERATURE: 465C (869F)

FLAMMABLE LIMITS IN AIR % BY VOLUME:

LEL: 2.5; UEL: 12.8

EXTREMELY FLAMMABLE LIQUID AND VAPOR! VAPOR MAY CAUSE FLASH FIRE.

EXPLOSION:

ABOVE FLASH POINT, VAPOR-AIR MIXTURES ARE EXPLOSIVE WITHIN FLAMMABLE LIMITS NOTED ABOVE. VAPORS CAN FLOW ALONG SURFACES TO DISTANT IGNITION SOURCE AND FLASH BACK. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. SEALED CONTAINERS MAY RUPTURE WHEN HEATED. THIS MATERIAL MAY PRODUCE A FLOATING FIRE HAZARD. SENSITIVE TO STATIC DISCHARGE.

FIRE EXTINGUISHING MEDIA:

DRY CHEMICAL, ALCOHOL FOAM OR CARBON DIOXIDE. WATER MAY BE INEFFECTIVE. WATER SPRAY MAY BE USED TO KEEP FIRE EXPOSED CONTAINERS COOL, DILUTE SPILLS TO NONFLAMMABLE MIXTURES, PROTECT PERSONNEL ATTEMPTING TO STOP LEAK AND DISPERSE VAPORS.

SPECIAL INFORMATION:

IN THE EVENT OF A FIRE, WEAR FULL PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN THE PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

=====

6. ACCIDENTAL RELEASE MEASURES

VENTILATE AREA OF LEAK OR SPILL. REMOVE ALL SOURCES OF IGNITION. WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AS SPECIFIED IN SECTION 8. ISOLATE HAZARD AREA. KEEP UNNECESSARY AND UNPROTECTED PERSONNEL FROM ENTERING. CONTAIN AND RECOVER LIQUID WHEN POSSIBLE. USE NON-SPARKING TOOLS AND EQUIPMENT. COLLECT LIQUID IN AN APPROPRIATE CONTAINER OR ABSORB WITH AN INERT MATERIAL (E. G., VERMICULITE, DRY SAND, EARTH), AND PLACE IN A CHEMICAL WASTE CONTAINER. DO NOT USE COMBUSTIBLE MATERIALS, SUCH AS SAW DUST. DO NOT FLUSH TO SEWER! IF A LEAK OR SPILL HAS NOT IGNITED, USE WATER SPRAY TO DISPERSE THE VAPORS, TO PROTECT PERSONNEL ATTEMPTING TO STOP LEAK, AND TO FLUSH SPILLS AWAY FROM EXPOSURES. US REGULATIONS (CERCLA) REQUIRE REPORTING SPILLS AND RELEASES TO SOIL, WATER AND AIR IN EXCESS OF REPORTABLE QUANTITIES. THE TOLL FREE NUMBER FOR THE US COAST GUARD NATIONAL RESPONSE CENTER IS (800) 424-8802. J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

=====

7. HANDLING AND STORAGE

PROTECT AGAINST PHYSICAL DAMAGE. STORE IN A COOL, DRY WELL-VENTILATED LOCATION, AWAY FROM ANY AREA WHERE THE FIRE HAZARD MAY BE ACUTE. OUTSIDE OR DETACHED STORAGE IS PREFERRED. SEPARATE FROM INCOMPATIBLES. CONTAINERS SHOULD BE BONDED AND GROUNDED FOR TRANSFERS TO AVOID STATIC SPARKS. STORAGE AND USE AREAS SHOULD BE NO SMOKING AREAS. USE NON-SPARKING TYPE TOOLS AND EQUIPMENT, INCLUDING EXPLOSION PROOF VENTILATION. CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTY SINCE THEY RETAIN PRODUCT RESIDUES (VAPORS, LIQUID); OBSERVE ALL WARNINGS AND PRECAUTIONS LISTED FOR THE PRODUCT.

=====

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

AIRBORNE EXPOSURE LIMITS:

ACETONE:

-OSHA PERMISSIBLE EXPOSURE LIMIT (PEL):
1000 PPM (TWA)

-ACGIH THRESHOLD LIMIT VALUE (TLV):

500 PPM (TWA), 750 PPM (STEL) A4 - NOT CLASSIFIABLE AS A HUMAN CARCINOGEN

VENTILATION SYSTEM:

A SYSTEM OF LOCAL AND/OR GENERAL EXHAUST IS RECOMMENDED TO KEEP EMPLOYEE EXPOSURES BELOW THE AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST VENTILATION IS GENERALLY PREFERRED BECAUSE IT CAN CONTROL THE EMISSIONS OF THE CONTAMINANT AT ITS SOURCE, PREVENTING DISPERSION OF IT INTO THE GENERAL WORK AREA. PLEASE REFER TO THE ACGIH DOCUMENT, "INDUSTRIAL VENTILATION, A MANUAL OF RECOMMENDED PRACTICES", MOST RECENT EDITION, FOR DETAILS.

PERSONAL RESPIRATORS (NIOSH APPROVED):

IF THE EXPOSURE LIMIT IS EXCEEDED AND ENGINEERING CONTROLS ARE NOT FEASIBLE, A HALF-FACE ORGANIC VAPOR RESPIRATOR MAY BE WORN FOR UP TO TEN TIMES THE EXPOSURE LIMIT, OR THE MAXIMUM USE CONCENTRATION SPECIFIED BY THE APPROPRIATE REGULATORY AGENCY OR RESPIRATOR SUPPLIER, WHICHEVER IS LOWEST. A FULL-FACE PIECE ORGANIC VAPOR RESPIRATOR MAY BE WORN UP TO 50 TIMES THE EXPOSURE LIMIT, OR THE MAXIMUM USE CONCENTRATION SPECIFIED BY THE APPROPRIATE REGULATORY AGENCY OR RESPIRATOR SUPPLIER, WHICHEVER IS LOWEST. FOR EMERGENCIES OR INSTANCES WHERE THE EXPOSURE LEVELS ARE NOT KNOWN, USE A FULL-FACE PIECE POSITIVE-PRESSURE, AIR-SUPPLIED RESPIRATOR. WARNING: AIR-PURIFYING RESPIRATORS DO NOT PROTECT WORKERS IN OXYGEN-DEFICIENT ATMOSPHERES.

SKIN PROTECTION:

WEAR IMPERVIOUS PROTECTIVE CLOTHING, INCLUDING BOOTS, GLOVES, LAB COAT, APRON OR COVERALLS, AS APPROPRIATE, TO PREVENT SKIN CONTACT.

EYE PROTECTION:

USE CHEMICAL SAFETY GOGGLES AND/OR A FULL FACE SHIELD WHERE SPLASHING IS POSSIBLE. MAINTAIN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES IN WORK AREA.

=====

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:

CLEAR, COLORLESS, VOLATILE LIQUID.

BOILING POINT:

56.5C (133F) @ 760 MM HG

ODOR:

MELTING POINT:

FRAGRANT, MINT-LIKE

-95C (-139F)

SOLUBILITY:

MISCIBLE IN ALL PROPORTIONS IN
WATER.

VAPOR DENSITY (AIR=1):

2.0

SPECIFIC GRAVITY:

0.79 @ 20C/4C

VAPOR PRESSURE (MM HG):

400 @ 39.5C (104F)

PH:

NO INFORMATION FOUND.

EVAPORATION RATE (BUAC=1):

CA. 7.7

% VOLATILES BY VOLUME @ 21C (70F):

100

10. STABILITY AND REACTIVITY

STABILITY:

STABLE UNDER ORDINARY CONDITIONS OF USE AND STORAGE.

HAZARDOUS DECOMPOSITION PRODUCTS:

CARBON DIOXIDE AND CARBON MONOXIDE MAY FORM WHEN HEATED TO DECOMPOSITION.

HAZARDOUS POLYMERIZATION:

WILL NOT OCCUR.

INCOMPATIBILITIES:

CONCENTRATED NITRIC AND SULFURIC ACID MIXTURES, OXIDIZING MATERIALS,
CHLOROFORM, ALKALIS, CHLORINE COMPOUNDS, ACIDS, POTASSIUM T-BUTOXIDE.

CONDITIONS TO AVOID:

HEAT, FLAMES, IGNITION SOURCES AND INCOMPATIBLES.

11. TOXICOLOGICAL INFORMATION

ORAL RAT LD50: 5800 MG/KG; INHALATION RAT LC50: 50,100MG/M3; IRRITATION EYE
RABBIT, STANDARD DRAIZE, 20 MG SEVERE; INVESTIGATED AS A TUMORIGEN,
MUTAGEN, REPRODUCTIVE EFFECTOR.

-----/CANCER LISTS/-----

INGREDIENT	---NTP CARCINOGEN---		IARC CATEGORY
	KNOWN	ANTICIPATED	
ACETONE (67-64-1)	NO	NO	NONE

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:

WHEN RELEASED INTO THE SOIL, THIS MATERIAL IS EXPECTED TO READILY
BIODEGRADE. WHEN RELEASED INTO THE SOIL, THIS MATERIAL IS EXPECTED TO LEACH
INTO GROUNDWATER. WHEN RELEASED INTO THE SOIL, THIS MATERIAL IS EXPECTED TO
QUICKLY EVAPORATE. WHEN RELEASED INTO WATER, THIS MATERIAL IS EXPECTED TO
READILY BIODEGRADE. WHEN RELEASED TO WATER, THIS MATERIAL IS EXPECTED TO
QUICKLY EVAPORATE. THIS MATERIAL HAS A LOG OCTANOL-WATER PARTITION

CHEMICAL WEAPONS CONVENTION: NO TSCA 12(B): NO CDTA: YES
SARA 311/312: ACUTE: YES CHRONIC: NO FIRE: YES PRESSURE: NO
REACTIVITY: NO (PURE / LIQUID)

AUSTRALIAN HAZCHEM CODE: 21YùE
POISON SCHEDULE: NONE ALLOCATED.

WHMIS: THIS MSDS HAS BEEN PREPARED ACCORDING TO THE HAZARD CRITERIA OF
THE CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS
ALL OF THE INFORMATION REQUIRED BY THE CPR.

=====

16. OTHER INFORMATION

NFPA RATINGS:
HEALTH: 1 FLAMMABILITY: 3 REACTIVITY: 0

For Additional Information:

Contact: MSDS Coordinator - Univar USA
During business hours, Pacific Time - (425) 889-3400

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END OF MSDS

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 04/03/2007

Date Updated: 08/22/2006

Version 1.1

Section 1 - Product and Company Information

Product Name	ACETONE-2,4-DNPH, 50MG, NEAT
Product Number	442436
Brand	SUPELCO
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
ACETONE	1567-89-1	No
2,4-DINITROPHENYLHYDRAZONE, ENVIRONM ENTAL STANDARD		
Formula	C9H10N4O4	

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Irritant.

Irritating to eyes, respiratory system and skin.

Possible sensitizer.

HMIS RATING

HEALTH: 2

FLAMMABILITY: 0

REACTIVITY: 0

NFPA RATING

HEALTH: 2

FLAMMABILITY: 0

REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is
conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give
artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious

amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT

N/A

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	238.21 AMU	
pH	N/A	
BP/EP Range	N/A	
MP/MP Range	126.0 - 128.0 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 1.51	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Nitrogen oxides.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes eye irritation.

Inhalation: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: Xi
Indication of Danger: Irritant.
R: 36/37/38
Risk Statements: Irritating to eyes, respiratory system and skin.
S: 26
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Irritant.
Risk Statements: Irritating to eyes, respiratory system and skin.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
US Statements: Possible sensitizer.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: Yes

Section 16 - Other Information

DISCLAIMER

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WARRANTY

The above information is believed to be correct but does not

purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.



MATERIAL SAFETY DATA SHEET

ADVASOL Solvent

PRODUCT IDENTIFICATION

Chemical Name: Petroleum Distillates

Chemical Family: Petroleum Hydrocarbon

Trade Name: ADVASOL 150 and ADVASOL 150E (7% max. naphthalene)

Synonyms: Aromatics Solvent, Wash Oil

Revision Date: September 18, 2001

Manufacturer /Distributor: Advanced Aromatics, L.P. 5501 Baker Road Baytown, TX 77520

EMERGENCY CONTACT: (281) 424-4505 24 hour number: (281) 424-9566 Chemtrec: (800) 424-9300

HAZARDOUS COMPONENTS

The following chemical components have been determined to be hazardous under OSHA's Hazard Communication Std. 29 CFR 1910.1200, and are listed in Table Z-1 1910.1000 (Toxic and Hazardous Substances).

CAS No.	Material or Component	Percentage
91-20-3	Naphthalene	14% Maximum
64742-94-5	Heavy aromatic petroleum naptha	84% - 94%

PHYSICAL DATA (TYPICAL)

Specific Gravity: .95-.98 @ 60°F

Boiling Point: 400°F

Vapor Density (Air=1): 4.9

Freezing Point: -35°F

Vapor Pressure (PSIA): <1 @ 100°F

Evaporation Rate (Butyl Acetate =1): <1.0

Solubility In Water at 1ATM & 25°C: NEGLIGIBLE

Viscosity: 2cst @ 100°F

Physical Description: Dark brown/green liquid with an aromatic odor.

FIRE AND EXPLOSION DATA

Flash Point: >150 °F (PMCC)

Flammable Limits in Air % by Volume:

Lower: 1.9

ACCEPTED SUBJECT TO SUBSEQUENT
VERIFICATION OF QUANTITY AND QUALITY
Upper: 6.8

Extinguishing Media: Use water, foam, carbon dioxide or dry chemical.

Special Fire Fighting Procedures: Wear complete personal protective equipment. SCBA required.

Unusual Fire and Explosion Hazard: None Known.

REACTIVITY DATA

Stability: Product is stable under normal storage conditions.

Conditions to Avoid: Extreme heat. Avoid contact with strong oxidizers (e.g. Chlorine, Peroxides, etc.) Toxic fumes and heat can be generated.

Incompatibility: Strong Oxidizers

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products When Heated: CO and CO₂ may be formed in the event of combustion. Toxic fumes may be formed during combustion.

HMIS RATING

NFPA 704 Rating: 0 – Insignificant 1 – Slight 2 – Moderate 3 – High 4 – Extreme

Health: 2 Flammability: 2 Reactivity: 1 Special Hazard: None Personal Protection: B

HEALTH HAZARD INFORMATION**Symptoms of Exposure:**

This is a combustible liquid that should be kept away from ignition sources. The product may cause skin irritation from prolonged exposure. Avoid breathing vapors, prolonged exposure could cause irritation to the respiratory system. Avoid contact when possible and use personnel equipment while handling this material. Use only in properly ventilated areas. Keep all containers closed when not in use. Empty containers will still contain residue, and should not be reused.

Health Effects:

ACUTE – Inhalation of high concentrations can cause nausea, dizziness, vomiting, disorientation, or unconsciousness.

IRONIC – Prolonged skin contact can cause dry skin and defatting, resulting in irritation or dermatitis.

Ingestion: Do not take internally. Seek medical attention if exposure occurs.

Skin: Exposure may irritate skin. Wash skin thoroughly for 15 minutes if contact occurs.

Inhalation: Inhalation of vapors may cause irritation to lungs.

Eyes: May cause eye irritation. Seek medical attention if exposure occurs.

Special Medical Conditions Aggravated by Exposure: None known.

Primary Route of Entry: Skin contact.

Exposure Limits: None Established

Petroleum Distillate TLV = 500PPM (2000 mg/m³) / Naphthalene TLV = 10 ppm (50 mg/m³)

Carcinogen Status: Not listed on (NTP) National Toxicology Program "Annual Report on Carcinogens", or (IARC) Intl. Agency for Research on Cancer "Monographs", and is not classified by OSHA as a carcinogen. NTP studies TR-410 and TR-500 show evidence of increased tumor growth in rodents based upon exposure to Naphthalene.

Toxicity: At this time there are no toxicity studies that exist for this product.

FIRST AID

Ingestion: Do not induce vomiting. Contact physician.

Skin: Remove soiled clothing and wash with soap and water. Contact physician. If irritation persists, contact physician.

Inhalation: Remove from area. If breathing irregular, administer oxygen.

Eyes: Flush eyes with water for at least 15 minutes. Contact physician.

SPILL OR LEAK PROCEDURES / WASTE DISPOSAL

In Case of a Transportation Accident, Contact CHEMTREC at 1-800/424-9300.

IN CASE OF SPILLS OR RELEASE: For small spill, use solid absorbent and shovel into disposal container. For large spills, dike the area to facilitate salvage or disposal. Shut off ignition sources and avoid breathing vapors. Avoid runoff into sewers and advise authorities.

Refer to DOT NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK for handling information.

Waste Disposal Method: Waste material should be disposed of consistent with federal, state, and local regulations. See Regulatory information below.

Disposal: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the RCRA 40 CFR 261, since it does not have the characteristics of Subpart C, nor is listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (sand, fly ash, or cement), so that no free standing liquids remain before disposal into an industrial landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

SPECIAL PROTECTION INFORMATION

Respiratory Protection: Have appropriate NIOSH approved respirator available. Organic cartridge respirator recommended.

Gloves: Impermeable gloves such as rubber, neoprene, PVC, viton, etc.

Eyes: Chemical splash goggles or faceshield. Eyewash facilities should be available in the area.

Ventilation: General use of local exhaust as required to control exposure.

SPECIAL PRECAUTIONS

Storage and Handling: Product should be stored away from source of ignition, or oxidizing agents. Prevent skin contact.

TRANSPORTATION INFORMATION

The proper shipping name / hazard class may vary by packaging, properties, and mode of transportation.

Proper shipping names are:

ALL TRANSPORTATION MODES: Petroleum Distillates, N.O. S.
(Unless Specified Below)

UN/ID No.: UN 1268
HAZARD CLASS : 3 – Combustible liquid
PACKING GROUP: III
CARGO AIRCRAFT LIMIT: 220L
PASSENGER AIRCRAFT LIMIT: 60L

TECHNICAL NAME(s): Naphthalene, Methyl naphthalene(s)
NET WT. (Per pkg.): 700 Lbs. (at 14% Naphthalene in Advasol 150)
MAJOR COMPONENTS (s): Naphthalene (100 lbs. Require reporting)
FLASH POINT: 150 Deg F

Mode of TRANSPORTATION: Petroleum Distillates, N.O. S.
ATA AO)

Disclaimer of Liability", see the statement on Page 5.

UN/ID No.: UN1268
 HAZARD CLASS : 9
 PACKING GROUP: III
 CARGO AIRCRAFT LIMIT: No Limit
 PASSENGER AIRCRAFT LIMIT: No Limit

MARINE TRANSPORTATION: Environmentally Hazardous Substances, Liquid N.O.S
 (IMDG / IMO)

UN/ID No.: UN 3082
 HAZARD CLASS : 9
 PACKING GROUP: III

MARINE POLLUTANT (s): None

REGULATORY INFORMATION RIGHT-TO-KNOW PROGRAM

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40CFR372.

CAS No.	Material or Component	% by Weight
91-20-3	Naphthalene	14% maximum
64742-94-5	Heavy aromatic petroleum naphtha	84%-94%

THE FOLLOWING FEDERAL REGULATIONS APPLY TO THIS PRODUCT:

OSHA HAZARD COMMUNICATION STD: 29 CFR 1910.1200 and 29 CFR 1910.1000 Table Z-1, Z-2, and Z-3.

Based on our hazard evaluation, the following components in this product are hazardous and the reasons are listed.

HEAVY AROMATIC NAPHTHA – Combustible, skin irritant.

NAPHTHALENE – Eye irritant

NAPHTHALENE – OSHA – 10ppm (50mg/m3) TWA for 8 hour workday, STEL = 15ppm (75 mg/m3).

ACGIH – 10ppm (52mg/m3) TWA for 8 hour workday, STEL = 15ppm (79 mg/m3).

CERCLA, 40 CFR 117.302: This product contains naphthalene, a reportable quantity (RQ) substance. The RQ for Naphthalene is 100 lbs. If a spill of Advasol 150 contains 100 or more pounds of Naphthalene, it requires notification to the National Response Center, Washington D.C. (1-800-424-8802). There may also be state and local requirements to report spills.

SARA TITLE III Section 302 - This product does not contain any components regulated under SARA TITLE III, Section 302 (Extremely Hazardous Substance).

Section 311, 312 - (MSDS Information) 40 CFR 370, This product has been determined to be hazardous, and should be reported under the following EPA hazard categories:

- xx--immediate (acute) health hazard
- Delayed (chronic) health hazard
- xx--Fire Hazard
- Sudden release of pressure hazard
- Reactive hazard

Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

Section 313 - This product contains the following component subject to regulation under SARA TITLE III, Section 313: Naphthalene

TOXIC SUBSTANCE CONTROL ACT (TSCA): The components in this product are on the TSCA inventory.

SOIL CONSERVATION and RECOVERY ACT (RCRA): Naphthalene is subject to regulation under 40 CFR 261

40 CFR 261 Subpart C & D. The hazardous waste code for naphthalene is U165.

CLEAN WATER ACT (CWA): Naphthalene is subject to regulation under sections 307 and 311 of the CWA.

CLEAN AIR ACT (CAA): Naphthalene is a listed "Hazardous air pollutant (HAP)" under Section 112 of the CAA.

STATE REGULATIONS:

California Proposition 65: Benzene, known to California to cause cancer, may be present as an impurity or residue.

Michigan Critical Materials : This product contains the following ingredient(s) identified on the Michigan Critical Materials Register:

Naphthalene

State Right to Know Laws: The following ingredient(s) are disclosed for compliance with state right to know laws:

METHYLNAPHTHALENE(S) 91-12-0

NAPHTHALENE(S) 91-20-3

INTERNATIONAL REGULATIONS: This product is a WHMIS controlled product under the House of Commons of Canada Bill C-70 (class B3 and class D2A). The product contains the following substance(s), from the Ingredient Disclosure List or has been evaluated based on it's toxicological properties, to contain the following hazardous ingredient(s):

HEAVY AROMATIC PETROLEUM NAPHTHA	64742-94-5	84%-94%
NAPHTHALENE	91-20-3	14% maximum

***ALL INFORMATION ON THIS MSDS MUST BE INCLUDED IN ALL MSDS THAT ARE
COPIED AND DISTRIBUTED FOR THIS MATERIAL.***

Information is provided for the customers of Advanced Aromatics; however, it does not address in detail the use, storage or handling of this product. Users of the product, considering their use, storage or handling of the product, may need to develop additional procedures. The information should not be relied on to insure compliance by the customer with any federal, state or local legal requirements. Information provided herein, are not product specifications.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration
MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communications Standard.
29CFR 1910.1200. Standard must be consulted for specific requirements.

SECTION I

MANUFACTURER'S NAME/REPACKAGED BY:

Certified Safety Manufacturing Company, Inc.

TELEPHONE NO.

(816) 483-9090

ADDRESS:

1400 Chestnut Avenue Kansas City, Missouri 64127

IDENTITY (AS USED ON LABEL):

Alcohol (IPA) 99%

DATE PREPARED:

07/25/06

DATE REVIEWED:

09/25/06

SECTION II – HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS (Specific Chemical Identity; Common Name(s)):

	%	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED
Isopropyl Alcohol (IPA) CAS# 67-63-0	99%	400 ppm		OSHA STEL=500ppm
(Isopropanol, 2-Propanol, Dimethyl Carbinol)				

THIS PRODUCT IS PRODUCED AS A HEALTH CARE ITEM "FOOD, DRUG OR COSMETIC,
INTENDED FOR PERSONAL CONSUMPTION BY EMPLOYEES WHILE IN THE WORKPLACE"
TO WHICH THE HAZARDOUS COMMUNICATIONS REQUIREMENTS OF: 29CFR1910.1200
(A) & (B) DO NOT APPLY, AS SPECIFICALLY STATED IN 29CFR 1910.1200 (B) (5) (V)

SECTION III – PHYSICAL DATA

BOILING POINT (°F):	181°F	SPECIFIC GRAVITY (H₂O= 1):	.878
VAPOR PRESSURE (mm Hg.):	33 mm 20 °C (68°F)	MELTING POINT:	No Data
SOLUBILITY IN WATER:	Miscible	% volatiles by Vol.:	No Data
PH:	No Data	FREEZING POINT:	-127°F

APPEARANCE AND ODOR:

Colorless, volatile liquid with the odor of rubbing alcohol

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): 53° F (TAG Open Cup) **FLAMMABLE LIMITS:** LEL: 2% UEL: 12%

EXTINGUISHING MEDIA: Use water fog, alcohol foam, dry chemical or CO₂

SPECIAL FIRE FIGHTING PROCEDURES: Special protective equipment for fire-fighters: Clear area of unprotected personnel. Wear complete turnout gear. Cool containers exposed to fire with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Containers exposed to intense heat from fires should be cooled with large amounts of water to prevent buildup of internal pressure due to vapor generation which could result in container rupture.

SECTION V – REACTIVITY DATA

STABILITY:	STABLE	√	CONDITIONS TO AVOID: None known
INCOMPATABILITY (Materials to avoid): Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acid, isocyanates			
HAZARDOUS POLYMERIZATION:	MAY OCCUR		CONDITIONS TO AVOID: Heat, sparks, and open flame
	WILL NOT OCCUR	√	Do NOT store in aluminum >120° F
HAZARDOUS PRODUCTS: CO ₂ and unidentified organic compounds may be formed of decomposition.			

SECTION VI – HEALTH HAZARD DATA			
ROUTE(S) OF ENTRY:	INHALATION?:	yes	SKIN?: yes INGESTION?: yes DERMAL CONTACT?: yes
HEALTH HAZARDS (<i>Acute and Chronic</i>): N/A			
CARCINOGENICITY: Not identified as a carcinogen by the NTP Annual Report on Carcinogens, IARC Monographs or by OSHA.			
SIGNS AND SYMPTOMS OF OVEREXPOSURE: Inhalation: Mild irritation of eyes, nose and throat.			
Ingestion: Drowsiness, headache Dermal contact: Dry, cracking skin Acute Effects: Irritation of skin and/or upper respiratory tract as noted above. Acute CNS depression may be manifested as giddiness, headache, dizziness and/or nausea. Chronic Effects: Chronic exposure can result in skin irritation and contact dermatitis. Pre-existing disorders of the skin, eyes, and respiratory tract may be exacerbated by exposure to isopropyl alcohol.			
EMERGENCY AND FIRST AID PROCEDURES: Inhalation: Remove victim to fresh air and provide oxygen if breathing is difficult. Seek medical attention if breathing continues to be difficult. Eye: Flush eyes with copious amount of water for a least 15 minutes. Skin: Flush with water. If irritation persists, seek medical attention.			
Ingestion: Do not induce vomiting if victim is unconscious or drowsy. Seek medical attention or contact the poison control center.			

SECTION VII – SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Large Spills: Eliminate all ignition sources. Equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Contain source of spill. Dike or otherwise confine spilled product. Uncontrolled releases to air, land or water may be reportable to the National Response Center (1-800-424-8802.) Small Spills: Take up with absorbent material and placed in non-leaking container; seal tightly. Dispose of absorbent.	
DISPOSAL CONSIDERATIONS: Contact your supplier or a licensed contractor for detailed recommendations.	
DISPOSAL REGULATORY REQUIREMENTS: Follow applicable Federal, state, and local regulations. Consider fuel blending as an alternative to incineration. ENVIRONMENTAL DEGRADATION: Should be removed readily from soils and water by volatilization and biodegradation.	

SECTION VIII – SPECIAL PROTECTION INFORMATION		
VENTILATION:	LOCAL EXHAUST: √	SPECIAL: None
	MECHANICAL (<i>General</i>): None	OTHER: None
Engineering measures: Use explosion-proof ventilation equipment as necessary to maintain airborne concentrations below the PEL. Ground all containers to prevent static sparks during fluid transfers.		
PROTECTIVE GLOVE: Gloves		EYE PROTECTION: Goggles
OTHER PROTECTIVE EQUIPMENT: NIOSH approved respiratory protection required when above PEL/TWA.		

SECTION IX – SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Handling Use non-sparking tools to open containers. Maintain appropriate class of fire extinguishers nearby in case of fire.	
Storage: Store in tightly closed containers in a cool, dry area away from heat and other possible ignition sources.	
Recommended Hygiene Practices: Clean PPE and work clothing contaminated prior to reuse. After working with this product, be sure to wash before eating, smoking, drinking or applying cosmetics.	

THIS INFORMATION AND RECOMMENDATIONS HEREIN ARE TAKEN FROM SOURCES BELIEVED TO BE ACCURATE AS OF THE DATE, HOWEVER CERTIFIED SAFETY MAKES NO WARRANTY WITH RESPECT TO THE ACCURACY OF THIS INFORMATION OR THE SUITABILITY OF THE RECOMMENDATIONS, AND ASSUMES NO LIABILITY TO ANY USE THEREOF.....



ALFOL® 6 Alcohol

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Trade name	ALFOL® 6 Alcohol		
Synonyms	1-Hexanol, Hexyl Alcohol		
Manufacturer/Supplier	Sasol North America Inc.		
Address	900 Threadneedle, Houston, TX 77079		
Telephone	CHEMTREC North America Transportation Emergency (24-hr)	(800)	424-9300
	CHEMTREC World Wide	(703)	527-3887
	Other Emergencies (24-hr)	(337)	494-5142
	MSDS and Product Information (8:00am-4:30pm CST)	(281)	588-3491
	Health and Safety Information (8:00am-4:00pm CST)	(281)	588-3492

SECTION 2 COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Components</u>	<u>CAS-No.</u>	<u>Weight %</u>
1-Hexanol	111-27-3	99.5

See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications.

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance	Colorless Liquid
Odor	Sweet, pungent
Precautions	WARNING! COMBUSTIBLE LIQUID AND VAPOR. CAUSES EYE AND SKIN IRRITATION. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Keep away from heat and flame.
Environmental precautions	Do not flush into surface water or sanitary sewer system. Low toxicity to aquatic organisms such as bacteria, algae, protozoa and fish. Rapidly, readily and extensively biodegradable.

POTENTIAL HEALTH EFFECTS

Eyes	Irritating to eyes. May cause corneal inflammation.
Skin	Prolonged skin contact may cause skin irritation and/or dermatitis. Normal care and personal hygiene should prevent skin effects.



ALFOL® 6 Alcohol

- Inhalation** Irritation of the nose and throat, dizziness, and headache.
- Ingestion** Depression of central nervous system can occur. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Aspiration (breathing) into lungs, caused while vomiting, may result in severe pulmonary injury.

(See Section 11 for Toxicological Information)

SECTION 4 FIRST AID MEASURES

- Eye contact** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
- Skin contact** Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. When symptoms persist or in all cases of doubt seek medical advice. Wash contaminated clothing before re-use.
- Inhalation** Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
- Ingestion** If swallowed, call a physician or poison control center immediately. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

SECTION 5 FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

- Flash point** 58 - 61 °C 136 - 142 °F
- Autoignition temperature** 290 °C 554 °F
- Flammable limits in air % by volume** **Lower explosion limit:** Approximately 1.2 %(V)
Upper explosion limit: Approximately 8.0 %(V)
- Fire and explosion** Flash back possible over considerable distance. NFPA Class II combustible liquid.
- Extinguishing media** Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- Fire fighting instructions** Wear self-contained breathing apparatus and protective suit. Keep containers and surroundings cool with water spray.

ALFOL® 6 Alcohol

SECTION 6 ACCIDENTAL RELEASE MEASURES

Steps to be taken in case of spill or leak Evacuate personnel to safe areas. Remove all sources of ignition. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). Do not flush into surface water or sanitary sewer system.

Spill precautions Material can create slippery conditions.

SECTION 7 HANDLING AND STORAGE

Safe handling advice Ensure all equipment is electrically grounded before beginning transfer operations.

Storage/Transport pressure Ambient.

Load/Unload temperature Ambient.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING MEASURES

Mechanical ventilation may be necessary if working with this product in enclosed areas and/or at elevated temperatures.

PERSONAL PROTECTIVE EQUIPMENT

Eyes When contact with liquid is possible, use a face shield and/or chemical splash goggles. Otherwise use safety glasses with side shields or goggles.

Skin Wear suitable protective clothing, gloves and eye/face protection.

Inhalation Respiratory protection is normally not required except in emergencies or when conditions cause excessive airborne levels of mists or vapors. NIOSH-approved organic vapor air-purifying respirator, self-contained breathing apparatus, or air-supplied respirators where there may be potential for overexposure.



ALFOL® 6 Alcohol

EXPOSURE GUIDELINES

Components Exposure limit(s)

No exposure limits have been established for this product.

PEL= Permissible Exposure Limits
TLV= Threshold Limit Value
EL= Excursion Limit

TWA= Time Weighted Average (8 hr.)
STEL= Short Term Exposure Limit (15 min.)
WEEL= Workplace Environmental Exposure Level

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid
Colour	Colorless
Odour	Sweet, pungent
Form	Liquid
Boiling point/range	156 - 158 °C 313 - 316 °F
Vapour pressure	0.5 mm Hg @ 21 °C
Vapor density	4.5
Solubility (water)	0.59 g/100g Nil.
Viscosity	5.5 cSt @ 21 °C
Melting point/range	-45 °C -49 °F
Density	0.820 g/cm ³ @ 15.5 °C

SECTION 10 STABILITY AND REACTIVITY

Conditions to avoid	Keep away from heat and sources of ignition.
Hazardous decomposition products	Combustion products include carbon dioxide, carbon monoxide and possibly other unidentified organic compounds.
Incompatibility with other materials	Can react with strong oxidizers, inorganic acids, and halogens.
Hazardous polymerization	None.



ALFOL® 6 Alcohol

SECTION 11 TOXICOLOGICAL INFORMATION

Eyes Primary irritation index (rabbit): 26.8 (Maximum score is 110.) (unwashed eyes)
Primary irritation index (rabbit): 32.6 (Maximum score is 110.) (washed eyes)
Irreversible corneal damage at day 3, the last day of observation.

Skin Primary irritation index (rabbit): 5.1 (Maximum score is 8.0.)
Acute dermal LD50 (rabbit): 1,500 - 2,300 mg/kg

Inhalation Acute 1 hours (rat): > 21 mg/l All rats survived at indicated concentration.

Ingestion Acute oral LD50(rat): 3,100 - 4,900 mg/kg

CARCINOGENICITY

This product contains no carcinogenic substances.

SECTION 12 ECOLOGICAL INFORMATION

Aquatic toxicity Low toxicity to aquatic organisms such as bacteria, algae, protozoa and fish.

LC50 (P. Promelas (fathead minnow)) 96 hours 97.2 mg/l
Test Substance: 1-Hexanol

Biodegradation Rapidly, readily and extensively biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

Waste code D001 - Ignitability (RQ 100 LB) Re-evaluation of the product may be required by the user at the time of disposal, since the product uses, transformations, mixtures, contamination, and spillage may change the classification.

Disposal methods Land disposal of this product is restricted. Dispose of only in accordance with local, state, and federal regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.

Empty containers Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, triple-rinsed, properly bunged and promptly returned to a drum reconditioner, or properly disposed.



ALFOL® 6 Alcohol

SECTION 14 TRANSPORT INFORMATION

- DOT description** Hexanols, 3, UN 2282, III This product is regulated as a hazardous material as defined by the Department of Transportation (DOT).
- IATA description** Hexanols, 3, UN 2282, III This product is regulated as a dangerous good as defined by ICAO/IATA for air transportation.
- IMDG description** Hexanols, 3, UN 2282, III This product is regulated as a dangerous good as defined by the IMDG Code for marine transport.

SECTION 15 REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

OSHA classification
Combustible liquid, eye irritant and skin irritant.

TSCA Inventory Listing

Components

CAS-No.

1-Hexanol

111-27-3

SARA 302 Status

Components

CAS-No.

Weight %

Contains no chemicals subject to SARA 302 reporting.

SARA 311/312 Classification

"Immediate (acute) health hazard", "Fire hazard"

SARA 313 Chemical

Components

CAS-No.

Weight %

Contains no chemicals subject to SARA 313 reporting.

CERCLA Hazardous Substance

Components

CERCLA RQ

Weight %

Contains no chemicals subject to CERCLA.



ALFOL® 6 Alcohol

INTERNATIONAL REGULATIONS

Workplace Hazardous Materials Information System (WHMIS) Classification

Class B, Division 3: Combustible liquid.

Class D, Division 2, Subdivision B: Toxic material.

Australian Inventory of Chemical Substances (AICS) Listing

Listed on the AICS.

Japanese Minister of International Trade and Industry (MITI) Inventory Listing

Listed on MITI.

Canadian Domestic Substance List (DSL) Inventory Listing

Listed on the DSL.

European Inventory of Existing Commercial Chemical Substances (EINECS) Listing

Listed on EINECS.

Philippines Inventory List (PICCS)

Listed on PICCS.

Korean Inventory List

Listed on the ECL.

China Inventory List

Listed on the China inventory.

STATE REGULATIONS

California Safe Drinking Water Act (Prop 65) Listing

Components

CAS-No.

Contains no chemical subject to California Prop 65.

SECTION 16 OTHER INFORMATION

HAZARD RATINGS

	<u>Health</u>	<u>Flammability</u>	<u>Reactivity</u>
HMIS	2	2	0
NFPA	1	2	0



ALFOL® 6 Alcohol

THE DATA AND INFORMATION CONTAINED HEREIN ARE BEING FURNISHED FOR INFORMATIONAL PURPOSES ONLY, UPON THE EXPRESS CONDITION THAT EACH CUSTOMER SHALL MAKE ITS OWN ASSESSMENT OF APPROPRIATE USE AND APPROPRIATE SHIPPING, TRANSFER AND STORAGE MATERIALS AND PROCEDURES FOR SASOL NORTH AMERICA'S PRODUCTS. ALTHOUGH BASED ON INFORMATION SOURCES WHICH SASOL NORTH AMERICA CONSIDERS ACCURATE AND RELIABLE, SASOL NORTH AMERICA MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDING THE VALIDITY OF THIS INFORMATION, THE INFORMATION SOURCES UPON WHICH THE SAME ARE BASED, OR THE RESULTS TO BE OBTAINED, AND EXPRESSLY DISCLAIMS LIABILITIES FOR DAMAGES OR INJURIES RESULTING FROM THE USE THEREOF.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **ALUMINUM SULFATE**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: ALUMINUM SULFATE

Synonyms: None

Chemical Family: Sulfate

Application: Additive

Manufacturer/Supplier: Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By: Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Aluminum sulfate	10043-01-3	60 - 100%	2 mg/m ³	2 mg/m ³

3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 0, Reactivity 0

HMS Ratings: Flammability 0, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.

Storage Information Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (95%)

Hand Protection Normal work gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	3.5
Specific Gravity @ 20 C (Water=1):	1.61
Density @ 20 C (lbs./gallon):	Not Determined

ALUMINUM SULFATE
Page 2 of 5

9. PHYSICAL AND CHEMICAL PROPERTIES

Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	342.18

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	LD50: 6200 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels:	None
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15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
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Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.
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END OF MSDS



Material Safety Data Sheet

Catalog Number: 227822
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 227822

Product name: ALUMINUM CHLORIDE

Synonyms: Aluminiumchlorid-hexahydrat; Aluminum chlorohydrate; Aluminum trichloride hexahydrate; Alluminio(cloruro di); Aluminico clorido; Chlorure d'aluminium; Trichloroaluminum

Supplier:

MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
ALUMINIUM CHLORIDE HEXAHYDRATE	7784-13-6	90 - 100%	10 mg/m ³ TWA (metal dust)	15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: The product causes burns of eyes, skin and mucous membranes

Category of Danger:
Corrosive

Principle routes of exposure: Skin

Inhalation: Vapors or dusts will cause burns of respiratory passages.

Ingestion: Can burn mouth, throat, and stomach

Skin contact: Causes skin burns

Eye contact: Risk of serious damage to eyes

ANSI Classification Corrosive

Statements of hazard CAUSES BURNS TO SKIN AND EYES

VAPORS OR MISTS CAN IRRITATE OR BURN THE RESPIRATORY TRACT.

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Catalog Number: 227822

Product name: ALUMINUM CHLORIDE

Page 1 of 6

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

Specific hazards:

Unusual hazards:

Special protective equipment for firefighters:

Use dry chemical, CO₂, water spray or "alcohol" foam
Burning produces irritant fumes.

None known

As in any fire, wear self-contained breathing apparatus
pressure-demand, MSHA/NIOSH (approved or equivalent)
and full protective gear

Water mist may be used to cool closed containers.

Specific methods:

Flash point:

Autoignition temperature:

Not determined

Not determined

NFPA rating:

NFPA Health: 3

NFPA Flammability: 0

NFPA Reactivity: 2

NFPA Special Note: w

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Environmental precautions:

Methods for cleaning up:

Use personal protective equipment.

Prevent product from entering drains.

Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:

Use only in area provided with appropriate exhaust
ventilation.

Safe handling advice:

Wear personal protective equipment.

Incompatible products:

Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: Breathing apparatus only if aerosol or dust is formed.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.

Eye protection: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor

White crystalline

Catalog Number: 227822

Product name: ALUMINUM CHLORIDE

Page 2 of 6

Physical state:	Powder
Formula:	AlCl ₃ · 6H ₂ O
Molecular weight:	241.4
Melting point/range:	> 285°C
Boiling point/range:	No Data available at this time.
Density:	2.4 g/ml
Vapor pressure:	1 hPa (at 20 °C)
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Soluble Reacts with water
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	Polymerization can occur.
Hazardous decomposition products:	Chloride/Hydrochloric acid
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Contact with air or water produces hydrochloric acid. Water, alcohol, alkenes cause polymerization. Incompatible with nitrobenzene, organic material, bases. Attacks metal in presence of moisture. Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components

ALUMINIUM CHLORIDE
HEXAHYDRATE

RTECS Number:

BD0530000

Selected LD50s and LC50s

Oral LD50 Rat : 3311 mg/kg
Oral LD50 Mouse : 1990 mg/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components

ALUMINIUM CHLORIDE
HEXAHYDRATE

NIOSH - Health Effects

Lung changes that may lead to pulmonary fibrosis; respiratory and skin irritation

NIOSH - Target Organs

respiratory system, skin, eyes; (for pyro powders, welding fumes, soluble salts and alkyls: respiratory system, skin)

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components ALUMINIUM CHLORIDE HEXAHYDRATE	U.S. DOT - Appendix B - Marine Pollutan Not Listed	U.S. DOT - Appendix B - Severe Marine Pollutants Not Listed	United Kingdom - The Red List: Not Listed
Components ALUMINIUM CHLORIDE HEXAHYDRATE	Germany VCI (WGK) Not Listed	World Health Organization (WHO) - Drinking Water Not Listed	Ecotoxicity - Fish Species Data Not Listed
Components ALUMINIUM CHLORIDE HEXAHYDRATE	Ecotoxicity - Freshwater Algae Data Not Listed	Ecotoxicity - Microtox Data Not Listed	Ecotoxicity - Water Flea Data Not Listed
Components ALUMINIUM CHLORIDE HEXAHYDRATE	EPA - ATSDR Priority List Rank (of 275): 193	EPA - HPV Challenge Program Chemical List Not Listed	California - Priority Toxic Pollutants Not Listed
Components ALUMINIUM CHLORIDE HEXAHYDRATE	California - Priority Toxic Pollutants Not Listed	California - Priority Toxic Pollutants Not Listed	

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging:

Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No:

3260

DOT:

Proper shipping name:
IATA Hazard Label(s):
Hazard Class

Corrosive solid, acidic, inorganic, n.o.s.
Corrosive
8 -
Corrosive materials
III

Packing group:**Emergency Response Guide Number (ERG):**

154

Components
ALUMINIUM CHLORIDE
HEXAHYDRATE

U.S. DOT - Appendix A Table 1 - Reportable Quantities
Not Listed

TDG (Canada):**WHMIS hazard class:**

E corrosive material



IMDG/IMO

Proper shipping name:

Corrosive solid, acidic, inorganic, n.o.s.

IMDG - Hazard Classifications
IMDG - Regulated SubstancesIMDG class or division = 8
UN3260

Components

U.S. DOT - Appendix B - Marine Pollutan

U.S. DOT - Appendix B - Severe Marine
PollutantsALUMINIUM CHLORIDE
HEXAHYDRATE

Not Listed

Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components

ALUMINIUM CHLORIDE HEXAHYDRATE

Inventory - United States TSCA - Sect. 8(b)

Present

Canada DSL Inventory List -

Present

Australia (AICS):

Present

Inventory - China:

Present

EU EINECS List -

231-208-1 (anhydrous)

Inventory - Japan:

1-12

Korean KECL:

KE-01045

Philippines PICCS:

Present

U.S. regulations:

Components

ALUMINIUM CHLORIDE
HEXAHYDRATECalifornia Proposition 65
-
Not ListedMassachusetts Right to
Know List:
[present]New Jersey Right to
Know List:
sn 0057Pennsylvania Right to Know
List:
[present]

Components

ALUMINIUM CHLORIDE
HEXAHYDRATEFlorida substance List:
[present] (as Al)Rhode Island Right to
Know List:
Not ListedIllinois - Toxic Air
Contaminants
Not ListedConnecticut - Hazardous Air
Pollutants
Not Listed

Components

ALUMINIUM CHLORIDE
HEXAHYDRATESARA 313 Emission
reporting/Toxic Release
of Chemicals
form R reporting required
for 1.0% de minimis
concentration (as Al) (fume
or dust only)CERCLA/SARA - Section NTP:
302 Extremely Haz

Not Listed

None

IARC:

None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable.

However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet



Material Safety Data Sheet

The Dow Chemical Company

Product Name: AMINOETHYLETHANOLAMINE.

Issue Date: 08/02/2006

Print Date: 05 Aug 2006

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

AMINOETHYLETHANOLAMINE.

COMPANY IDENTIFICATION

The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number:

800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

989-636-4400

Local Emergency Contact:

989-636-4400

2. Hazards Identification

Emergency Overview

Color: Colorless

Physical State: Liquid

Odor: Slightly ammoniacal

Hazards of product:

DANGER! Causes severe eye burns. Causes severe skin burns. Causes burns of the mouth and throat. May cause allergic skin reaction. Aspiration hazard. Can enter lungs and cause damage. Keep upwind of spill.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Skin Contact: Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage. May cause more severe response on covered skin (under clothing, gloves).

Classified as corrosive to the skin according to DOT guidelines.

* Indicates a Trademark

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Skin Sensitization: Skin contact may cause an allergic skin reaction. Individuals who have had an allergic skin reaction to similar materials may have an allergic skin reaction to this product. The similar material(s) is/are: Triethylenetetramine (TETA). Has caused allergic skin reactions when tested in mice. Has caused allergic skin reactions when tested in guinea pigs.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material may cause respiratory irritation.

Ingestion: Low toxicity if swallowed. Swallowing may result in gastrointestinal irritation or ulceration. Swallowing may result in burns of the mouth and throat. Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Effects of Repeated Exposure: In animals, effects have been reported on the following organs: Gastrointestinal tract. Kidney.

Birth Defects/Developmental Effects: Has caused birth defects in laboratory animals.

Reproductive Effects: Has been toxic to the fetus in laboratory animal tests. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

3. Composition Information

Component	CAS #	Amount
Aminoethylethanolamine	111-41-1	> 99.5 %
Triethylenetetramine mixture	112-24-3	> 0.1 %

4. First-aid measures

Eye Contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist.

Skin Contact: Immediately wash thoroughly any size exposure with non-abrasive soap and large quantities of water for 30 minutes while removing contaminated clothing and shoes. Destroy contaminated leather items such as shoes, belts, and watchbands. Wash contaminated clothing before reuse.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Ingestion: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

Notes to Physician: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if

this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Small spills: Absorb with materials such as: Clay. Dirt. Milsorb®. Sand. Do NOT use absorbent materials such as: Cellulose. Sawdust. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Dilute with large quantities of water. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Do not get in eyes, on skin, on clothing. Do not swallow. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed.

Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Store in a dry place. Do not store in: Zinc. Copper. Galvanized containers. Copper alloys. Additional storage and handling information on this product may be obtained by calling your Dow sales or customer service contact.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Aminoethylethanolamine	Dow IHG	TWA	0.5 mg/m3 SKIN, D-SEN
Triethylenetetramine mixture	WEEL	TWA	6 mg/m3 1 ppm SKIN

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

A D-SEN notation following the exposure guideline refers to the potential to produce dermal sensitization, as confirmed by human or animal data.

Personal Protection

Eye/Face Protection: Use chemical goggles. Eye wash fountain should be located in immediate work area.

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Polyethylene. Chlorinated polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. Avoid gloves made of: Polyvinyl alcohol ("PVA"). **NOTICE:** The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Liquid
Color	Colorless
Odor	Slightly ammoniacal
Flash Point - Closed Cup	127 °C (261 °F) <i>ASTM D93</i>
Flammable Limits In Air	Lower: No test data available Upper: No test data available
Autoignition Temperature	No test data available
Vapor Pressure	< 0.01 mmHg @ 20 °C <i>Literature</i>
Boiling Point (760 mmHg)	242.8 °C (469.0 °F) <i>Literature</i>
Vapor Density (air = 1)	3.6 <i>Literature</i>
Specific Gravity (H₂O = 1)	1.030 20 °C/20 °C <i>Literature</i>
Liquid Density	1.030 g/ml @ 15.56 °C <i>Literature</i> 1.027 g/ml @ 20 °C <i>Literature</i> 1.035 g/ml @ -45 °C <i>Literature</i> @ freezing pt.
Freezing Point	-45 °C (-49 °F) <i>Literature</i>
Melting Point	not applicable to liquids
Solubility in Water (by weight)	100 % <i>Literature</i>
pH	No test data available
Molecular Weight	104.15 g/mol
Octanol/Water Partition Coefficient	-1.46 <i>Measured</i>

Evaporation Rate (Butyl 0.01
Acetate = 1)
Kinematic Viscosity 98 mm²/s @ 25 °C Literature

10. Stability and Reactivity

Stability/Instability

Stable under recommended storage conditions. See Storage, Section 7. Hygroscopic.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Avoid moisture.

Incompatible Materials: Avoid contact with: Nitrites. Strong acids. Strong oxidizers. Product may potentially react with various halogenated organic solvents, resulting in temperature and/or pressure increases. Corrosive when wet. Heating above 60°C in the presence of aluminum can result in corrosion and generation of flammable hydrogen gas. Avoid unintended contact with: Halogenated hydrocarbons.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion

LD50, Rat 2,000 - 4,000 mg/kg

Skin Absorption

LD50, Rabbit 3,266 mg/kg

LD50, Rat 2,250 mg/kg

Sensitization

Skin

Skin contact may cause an allergic skin reaction. Individuals who have had an allergic skin reaction to similar materials may have an allergic skin reaction to this product. The similar material(s) is/are: Triethylenetetramine (TETA). Has caused allergic skin reactions when tested in mice. Has caused allergic skin reactions when tested in guinea pigs.

Repeated Dose Toxicity

In animals, effects have been reported on the following organs: Gastrointestinal tract. Kidney.

Repeated skin application to laboratory animals did not produce systemic toxicity.

Developmental Toxicity

Has caused birth defects in laboratory animals. However, the route(s) of exposure were not relevant for industrial hazard evaluation.

Reproductive Toxicity

Has been toxic to the fetus in laboratory animal tests. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

Genetic Toxicology

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information

CHEMICAL FATE

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Henry's Law Constant (H): $8.8\text{E-}10$ atm*m3/mole; 25 °C Estimated

Partition coefficient, n-octanol/water (log Pow): -1.46 Measured

Partition coefficient, soil organic carbon/water (Koc): 3.5 Estimated

Bioconcentration Factor (BCF): < 3.7; common carp (Cyprinus carpio); Measured

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is inherently biodegradable (reaches > 20% biodegradation in OECD test(s) for inherent biodegradability).

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
$1.20\text{E-}10$ cm3/s	1.1 h	Estimated

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
> 97 %	28 d	OECD 301F Test
30 - 50 %	37 d	OECD 302B Test

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
2 %	64 %	90 %	

Theoretical Oxygen Demand: 2.77 mg/mg

ECOTOXICITY

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, fathead minnow (Pimephales promelas), 96 h: 520 - 728 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea Daphnia magna, 48 h, immobilization: 65 mg/l

Aquatic Plant Toxicity

EC50, alga Scenedesmus sp., biomass growth inhibition, 72 h: 210 mg/l

Toxicity to Micro-organisms

EC50; bacteria, Growth inhibition, 16 h: > 5,000 mg/l

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. Transport Information**DOT Non-Bulk**

Proper Shipping Name: POLYAMINES, LIQUID, CORROSIVE, NOS

Technical Name: AMINOETHYLETHANOLAMINE

Hazard Class: 8 ID Number: UN2735 Packing Group: PG II

DOT Bulk

Proper Shipping Name: POLYAMINES, LIQUID, CORROSIVE, NOS

Technical Name: AMINOETHYLETHANOLAMINE

Hazard Class: 8 ID Number: UN2735 Packing Group: PG II

IMDG

Proper Shipping Name: POLYAMINES, LIQUID, CORROSIVE, NOS

Technical Name: AMINOETHYLETHANOLAMINE

Hazard Class: 8 ID Number: UN2735 Packing Group: PG II

EMS Number: F-A,S-B

ICAO/IATA

Proper Shipping Name: POLYAMINES, LIQUID, CORROSIVE, NOS

Technical Name: AMINOETHYLETHANOLAMINE

Hazard Class: 8 ID Number: UN2735 Packing Group: PG II

Cargo Packing Instruction: 812

Passenger Packing Instruction: 808

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information**OSHA Hazard Communication Standard**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard Yes

Delayed (Chronic) Health Hazard Yes

Fire Hazard No

Reactive Hazard No

Sudden Release of Pressure Hazard No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Aminoethylethanolamine	111-41-1	> 99.5 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information**Product Literature**

Additional information on this product may be obtained by calling your Dow Chemical Company sales or customer service contact.

Recommended Uses and Restrictions

Fabric softeners. Surfactants. Others.

Revision

Identification Number: 467 / 1001 / Issue Date 08/02/2006 / Version: 2.1

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.



Material Safety Data Sheet

Catalog Number: 207085
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 207085

Product name: AMYL ACETATE

Supplier:

MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
AMYL ACETATE	628-63-7	90 - 100%	50 ppm TWA (Pentyl acetate, all isomers)	100 ppm TWA; 525 mg/m ³ TWA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable, Harmful to flora, fauna, soil organisms and aquatic organisms.

Category of Danger:

Flammable , Dangerous for the environment

Principle routes of exposure: Skin

Inhalation: May cause irritation of respiratory tract

Ingestion: May be harmful if swallowed.

Skin contact: May cause allergic skin reaction

Eye contact: Avoid contact with eyes

Statements of hazard Flammable

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

Precautions - ANSI Label Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Catalog Number: 207085

Product name: AMYL ACETATE

Page 1 of 6

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

Carbon dioxide (CO₂), Dry powder, Foam, Water may be ineffective., Use dry chemical, CO₂, water spray or 'alcohol' foam.

Specific hazards:

Burning produces irritant fumes.

Unusual hazards:

None known

Special protective equipment for firefighters:

Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.

Specific methods:

Water mist may be used to cool closed containers.

Flash point:

Not determined

Autoignition temperature:

360-380 °C (680-716 °F)

NFPA rating:

NFPA Health:	1
NFPA Flammability:	2
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Use personal protective equipment.

Environmental precautions:

Prevent product from entering drains.

Methods for cleaning up:

Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:

Use only in area provided with appropriate exhaust ventilation.

Safe handling advice:

Wear personal protective equipment. Remove and wash contaminated clothing before reuse.

Technical measures/storage conditions:

Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition

Incompatible products:

Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Impervious clothing Long sleeved clothing

Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance and Odor**

Pure n-amyl acetate is a clear, colorless liquid. Commercial grades may be yellow. All grades have a banana-like odor.

Physical state:

Liquid

Formula:

C7-H14-O2

Molecular weight:

130.18

Melting point/range:

-70.8 °C (-95.4 °F)

Boiling point/range:

149.25 °C (300.7 °F)

Density:

0.876 at 20 °C (water = 1)

Vapor pressure:

5 mm Hg (0.67 kPa) at 25 °C

Evaporation rate:

0.42 (n-butyl acetate = 1)

Vapor density:

4.5 (air = 1)

Solubility (in water):

Slightly soluble

Flash point:

Not determined

Autoignition temperature:

360-380 °C (680-716 °F)

10. STABILITY AND REACTIVITY**Stability:**

Stable under recommended storage conditions.

Polymerization:

None under normal processing.

Hazardous decomposition products:

Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.

Materials to avoid:

Nitrates; strong oxidizers, alkalies, and acids

Conditions to avoid:

Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION**Product Information****Acute toxicity****Components**

AMYL ACETATE

RTECS Number:

AJ1925000

Selected LD50s and LC50s

Not Determined

Chronic toxicity:

Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.

Local effects:

Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Specific effects:

May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.

Primary irritation:

No data is available on the product itself.

Carcinogenic effects:

No data is available on the product itself.

Mutagenic effects:

No data is available on the product itself.

Reproductive toxicity:

No data is available on the product itself.

Components

AMYL ACETATE

NIOSH - Health Effects

Acute irritation of the eyes and upper respiratory tract, possible CNS depression, chronic skin irritation

NIOSH - Target Organs

eyes, skin, respiratory system, CNS

12. ECOLOGICAL INFORMATION**Mobility:**

No data available

Bioaccumulation:

No data available

Ecotoxicity effects:

No data available

Aquatic toxicity:

May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutant	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
AMYL ACETATE	Not Listed	Not Listed	Not Listed
Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
AMYL ACETATE	1	Not Listed	LC50 (96 hr) bluegill sunfish: 650 mg/L. Cond: Static, 23 °C.; LC50 (24-96 hr) mosquito fish: 65 mg/L.
Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
AMYL ACETATE	Not Listed	Not Listed	Not Listed
Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
AMYL ACETATE	Not Listed	indicator 2; Not sponsored	Not Listed
Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants	
AMYL ACETATE	Not Listed	Not Listed	

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

**Contaminated packaging:
Methods for cleaning up:**

Do not re-use empty containers
Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: 1104

DOT:

Proper shipping name: Amyl acetates (flammable liquid)
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 - Flammable liquid
Packing group: III

Emergency Response Guide Number (ERG): 129

Components U.S. DOT - Appendix A Table 1 - Reportable Quantities
AMYL ACETATE RQ = 5000 pounds (2270 kg)

TDG (Canada):

WHMIS hazard class:

B2 flammable liquids



:

IMDG/IMO

Proper shipping name:

Amyl acetates (flammable liquid)

IMDG - Hazard Classifications

IMDG class or division = 3

IMDG - Regulated Substances

UN1104

Components

U.S. DOT - Appendix B - Marine Pollutan

U.S. DOT - Appendix B - Severe Marine

AMYL ACETATE

Not Listed

Pollutants

Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components

AMYL ACETATE

Inventory - United States TSCA - Sect. 8(b)

Present

Canada DSL Inventory List -

Present

Australia (AICS):

Present

Inventory - China:

Present

EU EINECS List -

211-047-3; C7H14O2

Inventory - Japan:

2-733; 2-735

Korean KECL:

KE-01766

Philippines PICCS:

Present

U.S. regulations:

Components

AMYL ACETATE

California Proposition 65

Not Listed

Massachusetts Right to
Know List:

[present]

New Jersey Right to

Know List:

sn 1321

Pennsylvania Right to Know

List:

environmental hazard

Components

AMYL ACETATE

Florida substance List:

[present]

Rhode Island Right to

Know List:

Toxic

Illinois - Toxic Air

Contaminants

Not Listed

Connecticut - Hazardous Air

Pollutants

10,500 ug/m³ HLV; 2 ppmv HLV

Components

AMYL ACETATE

SARA 313 Emission
reporting/Toxic Release
of Chemicals

Not Listed

CERCLA/SARA - Section NTP:

302 Extremely Haz

Not Listed

None

IARC:

None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet



Material Safety Data Sheet

Catalog Number: 207085
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 207085

Product name: AMYL ACETATE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
AMYL ACETATE	628-63-7	90 - 100%	50 ppm TWA (Pentyl acetate, all isomers)	100 ppm TWA; 525 mg/m ³ TWA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable, Harmful to flora, fauna, soil organisms and aquatic organisms.

Category of Danger:
Flammable , Dangerous for the environment

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard Flammable

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

Precautions - ANSI Label Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Catalog Number: 207085

Product name: AMYL ACETATE

Page 1 of 6

EPAPA005000606

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

Carbon dioxide (CO₂), Dry powder, Foam, Water may be ineffective. Use dry chemical, CO₂, water spray or 'alcohol' foam.

Specific hazards:

Burning produces irritant fumes.

Unusual hazards:

None known

Special protective equipment for firefighters:

Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.

Specific methods:

Water mist may be used to cool closed containers.

Flash point:

Not determined

Autoignition temperature:

360-380 °C (680-716 °F)

NFPA rating:

NFPA Health:	1
NFPA Flammability:	2
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Use personal protective equipment.

Environmental precautions:

Prevent product from entering drains.

Methods for cleaning up:

Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:

Use only in area provided with appropriate exhaust ventilation.

Safe handling advice:

Wear personal protective equipment. Remove and wash contaminated clothing before reuse.

Technical measures/storage conditions:

Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition

Incompatible products:

Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Impervious clothing Long sleeved clothing

Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance and Odor**

Pure n-amyl acetate is a clear, colorless liquid. Commercial grades may be yellow. All grades have a banana-like odor.

Physical state:

Liquid

Formula:

C7-H14-O2

Molecular weight:

130.18

Melting point/range:

-70.8 °C (-95.4 °F)

Boiling point/range:

149.25 °C (300.7 °F)

Density:

0.876 at 20 °C (water = 1)

Vapor pressure:

5 mm Hg (0.67 kPa) at 25 °C

Evaporation rate:

0.42 (n-butyl acetate = 1)

Vapor density:

4.5 (air = 1)

Solubility (in water):

Slightly soluble

Flash point:

Not determined

Autoignition temperature:

360-380 °C (680-716 °F)

10. STABILITY AND REACTIVITY**Stability:**

Stable under recommended storage conditions.

Polymerization:

None under normal processing.

Hazardous decomposition products:

Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.

Materials to avoid:

Nitrates; strong oxidizers, alkalies, and acids

Conditions to avoid:

Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION**Product Information****Acute toxicity****Components**

AMYL ACETATE

RTECS Number:

AJ1925000

Selected LD50s and LC50s

Not Determined

Chronic toxicity:

Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.

Local effects:

Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Specific effects:

May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.

Primary irritation:

No data is available on the product itself.

Carcinogenic effects:

No data is available on the product itself.

Mutagenic effects:

No data is available on the product itself.

Reproductive toxicity:

No data is available on the product itself.

Components

AMYL ACETATE

NIOSH - Health Effects

Acute irritation of the eyes and upper respiratory tract, possible CNS depression, chronic skin irritation

NIOSH - Target Organs

eyes, skin, respiratory system, CNS

12. ECOLOGICAL INFORMATION**Mobility:**

No data available

Bioaccumulation:

No data available

Ecotoxicity effects:

No data available

Aquatic toxicity:

May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutant	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
AMYL ACETATE	Not Listed	Not Listed	Not Listed
Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
AMYL ACETATE	1	Not Listed	LC50 (96 hr) bluegill sunfish: 650 mg/L. Cond: Static, 23 °C.; LC50 (24-96 hr) mosquito fish: 65 mg/L.
Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
AMYL ACETATE	Not Listed	Not Listed	Not Listed
Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
AMYL ACETATE	Not Listed	indicator 2; Not sponsored	Not Listed
Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants	
AMYL ACETATE	Not Listed	Not Listed	

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Methods for cleaning up:

Do not re-use empty containers
Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: 1104

DOT:

Proper shipping name: Amyl acetates (flammable liquid)
 IATA Hazard Label(s): Flammable Liquid
 Hazard Class 3 - Flammable liquid
 Packing group: III

Emergency Response Guide Number (ERG): 129

Components **U.S. DOT - Appendix A Table 1 - Reportable Quantities**
 AMYL ACETATE RQ = 5000 pounds (2270 kg)

TDG (Canada):

WHMIS hazard class:

B2 flammable liquids



IMDG/IMO

Proper shipping name:

Amyl acetates (flammable liquid)

IMDG - Hazard Classifications

IMDG class or division = 3

IMDG - Regulated Substances

UN1104

Components

U.S. DOT - Appendix B - Marine Pollutan

U.S. DOT - Appendix B - Severe Marine
Pollutants

AMYL ACETATE

Not Listed

Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components

AMYL ACETATE

Inventory - United States TSCA - Sect. 8(b)

Present

Canada DSL Inventory List -

Present

Australia (AICS):

Present

Inventory - China:

Present

EU EINECS List -

211-047-3; C7H14O2

Inventory - Japan:

2-733; 2-735

Korean KECL:

KE-01766

Philippines PICCS:

Present

U.S. regulations:

Components

AMYL ACETATE

California Proposition 65

Not Listed

Massachusetts Right to

Know List:
[present]

New Jersey Right to

Know List:
sn 1321

Pennsylvania Right to Know

List:
environmental hazard

Components

AMYL ACETATE

Florida substance List:

[present]

Rhode Island Right to

Know List:
Toxic

Illinois - Toxic Air

Contaminants
Not Listed

Connecticut - Hazardous Air

Pollutants
10,500 ug/m³ HLTV; 2 ppmv HLTV

Components

AMYL ACETATE

SARA 313 Emission
reporting/Toxic Release
of Chemicals

Not Listed

CERCLA/SARA - Section NTP:
302 Extremely Haz

Not Listed

None

IARC:

None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET



SECTION 1 - PRODUCT AND COMPANY INFORMATION

PPG Kansai Automotive Finishes (PKAF)
5875 New King Court
Troy, MI 48098

EMERGENCY PHONE NUMBERS (412) 434-4515 (U.S.)
(24 hours/day):

(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
0532-3889090 (China)

TECHNICAL INFORMATION: 1-800-245-2590 (CLEVELAND, OH) 8:00 a.m. - 5:00 p.m. EST
PRODUCT SAFETY/MSDS INFORMATION: (412) 492-5555 7:00 a.m. - 4:30 p.m. EST
Product ID: CMS1009 (0019)
PRODUCT NAME: AMYL ALCOHOL
SYNONYMS: None
ISSUE DATE: 08/16/2005
EDITION NO.: 1
CHEMICAL FAMILY: SOLVENT

EMERGENCY OVERVIEW:

Combustible. Keep away from heat, sparks, flames, and other sources of ignition. Do not smoke. CAUSES IRREVERSIBLE EYE DAMAGE. MAY CAUSE SKIN BURNS. VAPOR AND/OR SPRAY MIST MAY BE HARMFUL IF INHALED. VAPOR IRRITATES EYES, NOSE, AND THROAT. HARMFUL IF SWALLOWED.

SECTION 2 - COMPOSITION INFORMATION

The following ingredient(s) marked with an "x" are considered hazardous under applicable U.S. OSHA and/or Canadian WHMIS regulations. If no ingredients are listed, then there are no U.S. OSHA and/or Canadian WHMIS hazardous ingredients in this product.

Material/ CAS Number	Percent	Hazardous
AMYL ALCOHOL 71-41-0	40 - 70	X
2-METHYLBUTYL ALCOHOL 137-32-6	15 - 40	X

SECTION 3 - HAZARDS IDENTIFICATION

ACUTE OVEREXPOSURE EFFECTS

EYE CONTACT:

This product contains a material which causes irreversible eye damage. Redness, itching, burning sensation and visual disturbances may indicate excessive eye contact.

SKIN CONTACT:

May cause skin burns. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact.

SKIN ABSORPTION:

Skin absorption not expected to occur.

INHALATION:

Vapor and/or spray mist may be harmful if inhaled. Vapor irritates eyes, nose, and throat.

INGESTION:

Harmful if swallowed.

SIGNS & SYMPTOMS OF OVEREXPOSURE:

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Eye watering, headaches, nausea, dizziness and loss of coordination are indications that solvent levels are too high. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Not applicable.

CHRONIC OVEREXPOSURE EFFECTS

Avoid long-term and repeated contact. Repeated exposure to vapors above recommended exposure limits (see Section 8) may cause irritation of the respiratory system and permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Prolonged exposure to an ingredient(s) in this product may cause kidney and/or liver damage. Prolonged inhalation of an ingredient(s) in this product may cause edema of the lungs and/or lung damage. The effects of long-term, low level exposures to this product have not been determined. Safe handling of this material on a long-term basis should emphasize the prevention of all contact with this material to avoid any effects from repetitive acute exposures. See Section 11, of this MSDS for a detailed list of chronic health effects information available on individual ingredients in this product.

SECTION 4 - FIRST AID MEASURES

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available.

EYE CONTACT:

Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

SKIN CONTACT:

Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

INHALATION:

Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

INGESTION:

Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

SECTION 5 - FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASHPOINT: 113 Degrees F (45 Degrees C)

FLASHPOINT TEST METHOD:

Pensky-Martens Closed Cup

UEL: Not Available.

LEL: 1.2

AUTOIGNITION TEMPERATURE:

Not Available.

EXTINGUISHING MEDIA:

Use National Fire Protection Association (NFPA) Class B extinguishers (carbon dioxide, dry chemical, or universal aqueous film forming foam) designed to extinguish NFPA Class II combustible liquid fires. Water spray may be ineffective. Water spray may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

PROTECTION OF FIREFIGHTERS:

Fire-fighters should wear self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Keep this product away from heat, sparks, flame, and other sources of ignition (i.e., pilot lights, electric motors, static electricity). Invisible vapors can travel to a source of ignition and flash back. Do not smoke while using this product. Keep containers tightly closed when not in use. Closed containers may explode when overheated. Do not apply to hot surfaces. Toxic gases may form when this product comes in contact with extreme heat. May produce hazardous decomposition products when exposed to extreme heat. Extreme heat includes, but is not limited to, flame cutting, brazing, and welding.

SECTION 6 - ACCIDENTAL RELEASE MEASURE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Provide maximum ventilation. Only personnel equipped with proper respiratory, skin, and eye protection should be permitted in the area. Remove all sources of ignition. Take up spilled material with sand, vermiculite, or other noncombustible absorbent material and place in clean, empty containers for disposal. Only the spilled material and the absorbant should be placed in this container.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:

Vapors may collect in low areas. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts. Containers should be grounded when pouring. Avoid free fall of liquids in excess of a few inches.

STORAGE:

Do not store above 120 degrees F. (48 degrees C.). Store large quantities in buildings designed and protected for storage of NFPA Class II combustible liquids.

SECTION 8 - EXPOSURE CONTROLS & PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 8 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

PERSONAL PROTECTIVE EQUIPMENT

EYES:

Wear chemical-type splash goggles and full face shield when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapors.

SKIN/GLOVES:

Wear protective clothing sufficient to cover exposed skin surfaces. For applications where skin contact is likely and impermeable clothing is necessary, select clothing constructed of: butyl rubber. No specific permeation/degradation testing have been done on protective clothing for this product. Recommendations for skin protection are based on infrequent contact with this product. For frequent contact or total immersion, contact a manufacturer of protective clothing for appropriate chemical impervious equipment. Clean contaminated clothing and shoes.

RESPIRATOR:

Overexposure to vapors may be prevented by ensuring proper ventilation controls, vapor exhaust or fresh air entry. A NIOSH- approved air purifying respirator with the appropriate chemical cartridges or a positive-pressure, air-supplied respirator may also reduce exposure. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against which the respirator is effective, its limitations, and how it is to be properly fitted and used. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

GENERAL HYGIENE - ESTABLISHED EXPOSURE LIMITS

If Threshold Limit Values (TLVs) have been established by ACGIH, OSHA, Ontario or PPG, they will be listed below. These limits are intended for use in the practice of industrial hygiene as guidelines or recommendations in the control of potential workplace health hazards. These limits are not a relative index of toxicity and should not be used by anyone without industrial hygiene training.

Key: OSHA=Occupational Safety and Health Administration;
PEL=Permissible Exposure Limit; Ceiling=PEL Ceiling Limit; STEL=PEL Short-Term Exposure Limit; Skin=OSHA Skin Designation.
Key: ACGIH=American Conference of Governmental Industrial Hygienists; OSHA=Occupational Safety and Health Administration;
TLV=Threshold Limit Value; TWA=Time Weighted Average;
PEL=Permissible Exposure Limit; IPEL=Internal Permissible Exposure Limit; Ceiling=TLV or PEL Ceiling Limit; STEL=TLV or PEL Short-Term Exposure Limit; Skin= Skin Absorption Designation. [C- Ceiling Limit; S- Potential Skin Absorption; R-Respirable Dust]
Additional Information Not applicable.

SECTION 9 - PHYSICAL & CHEMICAL PROPERTIES (FORMULA VALUES, NOT SALES SPECIFICATIONS)

SPECIFIC GRAVITY:	.817
PHYSICAL STATE:	Liquid
Percent Solids:	.00
Percent Volatile by Volume:	100.000
pH:	Not available.
ODOR THRESHOLD:	Not available.
Vapour Pressure:	2.0 mmHg
ODOR/APPEARANCE:	Non-viscous liquid with an odor characteristic of the ingredients listed in Section 2.
VAPOR DENSITY:	HEAVIER THAN AIR
Evaporation Rate:	17
BOILING POINT OR RANGE:	271 - 280Degrees F
Freezing Point or Range:	Not Applicable.
Melting Point or Range(°C):	Not Applicable.
Partition coefficient (n-octanol/water):	Not Applicable.
WEIGHT PER GALLON:	6.8 (U.S.) / 8.17 (IMPERIAL)

SECTION 10 - STABILITY AND REACTIVITY

STABILITY:

This product is normally stable and will not undergo hazardous reactions.

CONDITIONS TO AVOID:

None Known.

INCOMPATIBLE MATERIALS:

Avoid contact with strong alkalis, strong mineral acids, or strong oxidizing agents.

HAZARDOUS POLYMERIZATION:

None Known.

HAZARDOUS DECOMPOSITION PRODUCTS:

- Carbon monoxide - Carbon dioxide

PPG Kansai Automotive Finishes (PKAF)
5875 New King Court
Troy, MI 48098

Product ID: CMS1009 (0019)
PRODUCT NAME: AMYL ALCOHOL

SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Material/ CAS Number	Percent	ORAL LD50 (g/kg)	DERMAL LD50 (g/kg)	INHALATION LC50 (mg/l)
AMYL ALCOHOL 71-41-0	40 - 70	2.20 g/kg	3.60 g/kg	Not Available
2-METHYLBUTYL ALCOHOL 137-32-6	15 - 40	4.92 g/kg	3.54 g/kg	Not Available

CHRONIC TOXICITY

Target Organs:

- Kidney - Liver - Lung - Brain - Central nervous system

Mutagenicity Toxicity:

This has not been tested for this product.

Reproductive Toxicity:

This has not been tested for this product.

SUPPLEMENTAL HEALTH INFORMATION:

SECTION 12 - ECOLOGICAL INFORMATION

POTENTIAL ENVIRONMENTAL EFFECTS

Ecotoxicity: No information Available.

ENVIRONMENTAL FATE

Mobility: No information available.

Biodegradation: No information available.

Bioaccumulation: No information Available.

PHYSICAL/CHEMICAL

Hydrolysis: No information available.

Photolysis: No information available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Provide maximum ventilation, only personnel equipped with proper respiratory and skin and eye protection should be permitted in the area. Take up spilled material with sawdust, vermiculite, or other absorbent material and place in containers for disposal.

Waste material must be disposed of in accordance with federal, state, provincial and local environmental control regulations. Empty containers should be recycled by an appropriately licensed reconditioner/salvager or disposed of through a permitted waste management facility. Additional disposal information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

SECTION 14 - TRANSPORTATION INFORMATION

Proper Shipping Name: NOT AVAILABLE
NOS Technical Name: NOT AVAILABLE
Hazard Class: N.A.
Subsidiary Class(es): N.A.
UN Number: N.A.
Packing Group: N.A.

USA - RQ Hazardous Substances: NOT AVAILABLE

USA-RQ Hazardous Substance NOT AVAILABLE

Threshold Ship Weight:

Marine Pollutant Name: NOT AVAILABLE

SECTION 15 - REGULATORY INFORMATION

INVENTORY STATUS

U.S. TSCA: This product and/or all of its components are listed on the U.S. TSCA Inventory or is otherwise exempt from TSCA Inventory reporting requirements.

FEDERAL REGULATIONS

US Regulations

Material/ CAS Number	Percent	CERCLA HS - RQ (LBS)	SARA EHS- TPQ (LBS)	SARA 313
AMYL ALCOHOL 71-41-0	40 - 70	Not Listed	Not Listed	Not Listed
2-METHYLBUTYL ALCOHOL 137-32-6	15 - 40	Not Listed	Not Listed	Not Listed

SARA 311/312

Health (acute): Yes

Health (chronic): Yes

Fire (flammable): Yes

Pressure: No

Reactivity: No

WHMIS HAZARD CLASS: - Class B, Division 3 - Class D, Division 2, Subdivision A - Class D, Division 2, Subdivision B

STATE/PROVINCIAL REGULATIONS

Additional Information

Key: IARC- International Agency on the Research of Cancer; ACGIH- American Conference of Governmental Industrial Hygienists; NTP- National Toxicology Program *Denotes chemical as NTP Known Carcinogen; + Denotes NTP Possible Carcinogen; OSHA- Occupational Safety and Health Administration.

SECTION 16 - OTHER INFORMATION

Hazard Rating Systems

NFPA Rating: 3 20

HMIS Rating: 3*20

Rating System: 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe, *=Chronic Effects.

HMIS=Hazardous Materials Identification System; NFPA=National Fire Protection Association;

Safe handling of this product requires that all of the information on the MSDS be evaluated for specific work environments and conditions of use.

PREPARED BY: Product Safety Department

REASON FOR REVISION: Date. Edition.

Updated MSDS
format.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200), the supplier notification requirements of SARA Title III, Section 313 and other applicable right-to-know regulations. Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

CMS1009 000001 (00231145.002)(08/16/05)
020327, 000, 0019

*** END OF MSDS ***

Safety data sheet

1,2-Pentanediol

(Amylene Glycol)

Revision date : 2006/05/09
Version: 1.0

Page: 1/5
(30036634/MDS GEN US/EN)

1. Substance/preparation and company identification

Company

BASF CORPORATION
100 Campus Drive
Florham Park, NJ 07932

24 Hour Emergency Response Information

CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP

2. Composition/information on ingredients

CAS Number

5343-92-0
41051-72-3

Content (W/W)

80.0 - 100.0 %
1.0 - 5.0 %

Chemical name

pentane-1,2-diol
1,2-Butanediol, 2-methyl-

3. Hazard identification

Emergency overview

DANGER: CAUSES EYE IRRITATION.
RISK OF SERIOUS DAMAGE TO EYES.
INGESTION MAY CAUSE GASTRIC DISTURBANCES.
Avoid contact with the skin, eyes and clothing.
Avoid inhalation of mists/vapours.
Use with local exhaust ventilation.
Wear appropriate respiratory protection.
Wear NIOSH-certified chemical goggles.
Wear full face shield if splashing hazard exists.
Wear chemical resistant protective gloves.
Wear protective clothing.
Eye wash fountains and safety showers must be easily accessible.

Potential health effects

Primary routes of exposure

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

4. First-aid measures

General advice:

Remove contaminated clothing.

Safety data sheet

1,2-Pentanediol

Revision date : 2006/05/09
Version: 1.0

Page: 2/5
(30036634/MDS_GEN_US/EN)

If inhaled:

If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

If on skin:

Wash thoroughly with soap and water.

If irritation develops, seek medical attention.

If in eyes:

Wash affected eyes for at least 15 minutes under running water with eyelids held open. Seek medical attention.

If swallowed:

Rinse mouth immediately and then drink plenty of water, seek medical attention.

5. Fire-fighting measures

Flash point:	110 °C	(DIN 51758)
Autoignition:	380 °C	(DIN 51794)
Lower explosion limit:	1.7 %(V)	
Upper explosion limit:	9.3 %(V)	

Suitable extinguishing media:

water, alcohol-resistant foam, dry extinguishing media, carbon dioxide

Protective equipment for fire-fighting:

Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:

Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

NFPA Hazard codes:

Health : 3 Fire: 1 Reactivity: 0 Special:

6. Accidental release measures

Personal precautions:

Handle in accordance with good industrial hygiene and safety practice.

Environmental precautions:

Discharge into the environment must be avoided.

Cleanup:

For large amounts: Pump off product.

For residues: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr). Dispose of absorbed material in accordance with regulations.

7. Handling and storage

Handling

General advice:

Ensure thorough ventilation of stores and work areas.

Protection against fire and explosion:

Take precautionary measures against static discharges. Sources of ignition should be kept well clear.

Safety data sheet

1,2-Pentanediol

Revision date : 2006/05/09
Version: 1.0

Page: 3/5
(30036634/MDS_GEN_US/EN)

Storage

Storage stability:
Storage duration: 24 Months

8. Exposure controls and personal protection

Advice on system design:
Provide local exhaust ventilation to control vapours/mists.

Personal protective equipment

Respiratory protection:
Wear respiratory protection if ventilation is inadequate.

Hand protection:
Wear chemical resistant protective gloves., Consult with glove manufacturer for testing data.

Eye protection:
Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:
Body protection must be chosen based on level of activity and exposure.

General safety and hygiene measures:
Avoid contact with the skin, eyes and clothing. Wearing of closed work clothing is required additionally to the stated personal protection equipment.

9. Physical and chemical properties

Form:	liquid	
Odour:	odourless	
Colour:	colourless to yellowish	
pH value:	7 - 8	(500 g/l, 20 °C)
Melting point:	< -40 °C	
Boiling point:	208 - 210 °C	
Vapour pressure:	< 1 mbar	(20 °C)
Density:	0.97 g/cm3	(20 °C)
Solubility in water:		(20 °C) miscible

10. Stability and reactivity

Hazardous reactions:
No hazardous reactions if stored and handled as prescribed/indicated.

11. Toxicological information

Acute toxicity

Oral:
LD50/rat: > 12,000 mg/kg

Skin irritation:
rabbit: non-irritant (OECD Guideline 404)

Safety data sheet

1,2-Pentanediol

Revision date : 2006/05/09
Version: 1.0

Page: 4/5
(30036634/MDS_GEN_US/EN)

Eye irritation :
rabbit: Irritant. (OECD Guideline 405)

Risk of serious damage to eyes.

Chronic toxicity

Other information:
No experimental evidence available for genotoxicity in vitro (Ames test negative).

12. Ecological information

Environmental fate and transport

Biodegradation:
Test method: OECD 302B; ISO 9888; 88/302/EEC, part C
Method of analysis: DOC reduction
Degree of elimination: > 90 %
Evaluation: Easily eliminated from water.

Chemical oxygen demand (COD):
2,070 mg/g

Biochemical oxygen demand (BOD):
: 1,070 mg/g

Adsorbable organically-bound halogen (AOX):

This product contains no organically-bound halogen.

Acute and prolonged toxicity to fish:
OECD 203; ISO 7346; 84/449/EEC, C.1 static
zebra fish/LC50 (96 h): > 1,000 mg/l

Acute toxicity to aquatic invertebrates:
Directive 79/831/EEC Daphnia magna/EC50 (48 h): > 500 mg/l

Toxicity to aquatic plants:
DIN 38412 Part 9 EC50 (72 h): > 500 mg/l

Toxicity to microorganisms:
DIN 38412 Part 8 bacterium/EC50 (17 h): > 10,000 mg/l

13. Disposal considerations

Waste disposal of substance:
Do not discharge into waterways or sewer systems without proper authorization.
Dispose of in accordance with national, state and local regulations.

Container disposal:
Dispose of container and any rinsate in an environmentally safe manner. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

14. Transport information

Safety data sheet

1,2-Pentanediol

Revision date : 2006/05/09
Version: 1.0

Page: 5/5
(30036634/MDS_GEN_US/EN)

Land transport USDOT

Not classified as a dangerous good under transport regulations

Sea transport IMDG

Not classified as a dangerous good under transport regulations

Air transport IATA/ICAO

Not classified as a dangerous good under transport regulations

15. Regulatory information

Federal Regulations

Registration status:

TSCA, US

released / listed

OSHA hazard category:

Skin and/or eye irritant

SARA hazard categories (EPCRA 311/312): Acute

16. Other information

HMIS III rating

Health: 3

Flammability: 1

Physical hazard: 0

HMIS uses a numbering scale ranging from 0 to 4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates high hazard.

Local contact information

prod_reg@basf.com

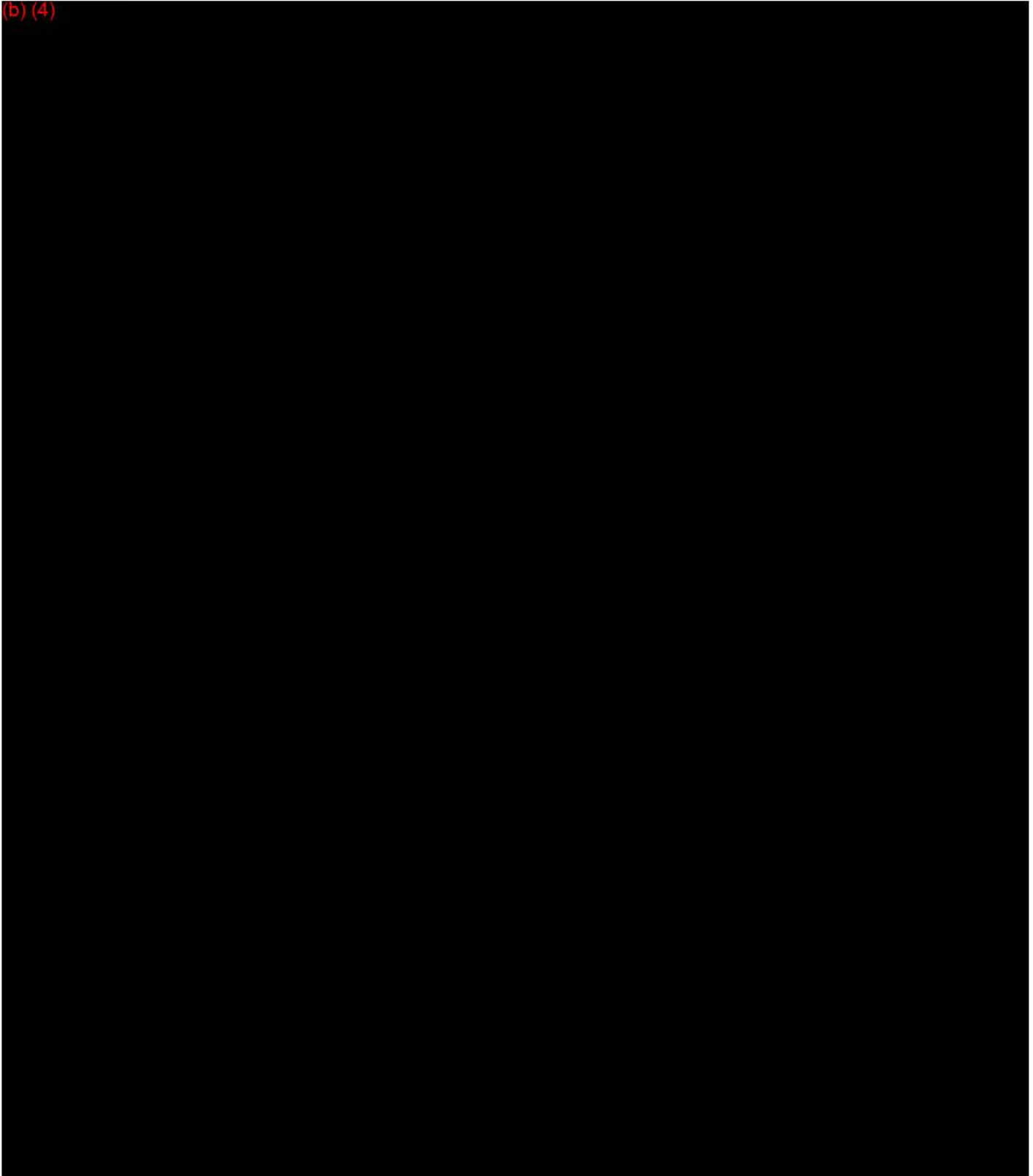
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END OF DATA SHEET



Asphalt Cement, All Grades

Material Safety Data Sheet

(b) (4)



Asphalt Cement, All Grades

(b) (4)



Asphalt Cement, All Grades

(b) (4)



Asphalt Cement, All Grades

(b) (4)



Asphalt Cement - All Grades

(b) (4)



Asphalt Cement, All Grades

(b) (4)



Asphalt Cement, All Grades

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Asphalt Cement, All Grades

(b) (4)



Asphalt Cement, All Grades

(b) (4)



***** END OF MSDS *****

Material Safety Data Sheet

(complies with OSHA's Hazard Communication Standard)
(29 CFR 1910.1200)

Date Prepared:
8/6/02

Section I

Manufacturer's Name:

Hormel Foods Corporation
1 Hormel Place
Austin, MN 55912

Emergency Telephone Number:

507-437-5264

Telephone Number for Information:

507-437-5264

Section II

Hazardous Ingredients/Identity Information:

Porcine Choice White Grease - Animal Fats

NOTE: According to OSHA regulation 29 CFR 1910.1200, appendixes A and B, animal fats are not considered hazardous.

Section III

Physical/Chemical Characteristics:

Boiling Point	N/A	Specific Gravity (H ₂ O=1)	0.88
Vapor Pressure	N/A	Melting Point	105°F
Vapor Density	N/A	Evaporation Rate	N/A
Solubility in Water	Not Soluble		
Appearance and Odor	amber to brown liquid when heated, white to brown when solid, fatty odor.		

Section IV

Fire and Explosion Hazard Data:

Flash Point:
450°F

Flammable Limits:
530°F

LEL:
N/A

UEL:
N/A

Extinguishing Media:

Dry chemical, carbon dioxide, water spray, or regular foam.

Special Fire Fighting Procedures:

For larger fires, use water spray, fog or regular foam.

(See 1990 Emergency Response Guidebook, DOT P5800.5)

Unusual Fire and Explosion Hazards:

No acute hazard.

Section V

Reactivity Data:

Stability:

Stable

Incompatibility (Materials to Avoid):

Oxidizers (strong)

Hazardous Decomposition or Byproducts:

Thermal decomposition products may include toxic oxides of carbon.

Hazardous Polymerization:

Not reported to occur.

Section VI

Health Hazard Data:

Route(s) of Entry:

Inhalation N/A

Skin N/A

Ingestion N/A

Health Hazards:

According to OSHA regulation 29 CFR 1910.1200 Appendixes A and B, feed

Fats are not considered hazardous.

Carcinogenicity? N/A NTP? N/A

IARC Monographs? N/A OSHA regulated? N/A

Signs and Symptoms of Exposure N/A

Medical Conditions Generally Aggravated by Exposure N/A

Exposure and First Aid Procedures

Hot liquid fat may cause burns

Section VII

Precautions for Safe Handling and Use:

Steps to be taken in case material is released or spilled:

Take steps to contain material, let harden, then remove.

May use suitable absorbent.

Waste Disposal Method:

Rendering company or landfill. May be subject to Federal, State or Local Laws.

Precautions to be taken in handling and storage:

N/A

Other Precautions:

N/A

Section VIII

Control Measures:

Respiratory Protection	N/A		
Ventilation:			
Local Exhaust	N/A	Special	N/A
Mechanical	N/A	Other	N/A
Protective Gloves	N/A	Eye Protection	N/A
Other Protective Clothing			
Or Equipment	N/A		
Work/Hygienic Practices	N/A		

Section IX

Special Precautions and Comments:

Precautions to be taken in handling and storage:	None
Other Precautions:	None
Effective Date:	August 8, 2001
Phone Number:	507-437-5264
IMPORTANT:	

The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage and handling of the product in compliance with applicable federal, state and local laws and regulations. Hormel Foods Corporation makes no warranty of any kind, express or implied, concerning the completeness of the information and data herein. Hormel Foods Corporation will not be liable for claims relating to any party's use of, or reliance on, information and data contained herein regardless of whether it is claimed that the information and data are inaccurate, incomplete or otherwise misleading. This information relates to the material designated and may not be valid for such material used in combination with any other materials nor in any process.



Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

1 Identification of substance:**Product details:****Product name:** Barium hydroxide**Stock number:** 14499**Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Emergency Phone: (978) 521-6300

CHEMTREC: (800) 424-9300

Web Site: www.alfa.com**Information Department:** Health, Safety and Environmental Department**Emergency information:**

During normal hours the Health, Safety and Environmental Department.

After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:**Chemical characterization:****Description: (CAS#)**

Barium hydroxide, octahydrate (CAS# 12230-71-6): 100%

Identification number(s):**EINECS Number:** 241-234-5**EU Number:** 056-002-00-7**3 Hazards identification****Hazard description:**

Xn Harmful

Information pertaining to particular dangers for man and environment

R 20/22 Harmful by inhalation and if swallowed.

Classification system**HMIS ratings (scale 0-4)****(Hazardous Materials Identification System)**

HEALTH	2
FIRE	0
REACTIVITY	1

Health (acute effects) = 2

Flammability = 0

Reactivity = 1

4 First aid measures**After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

(Contd. on page 2)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Barium hydroxide

(Contd. of page 1)

After swallowing Seek immediate medical advice.**5 Fire fighting measures****Suitable extinguishing agents**

Product is not flammable. Use fire fighting measures that suit the surrounding fire.

Special hazards caused by the material, its products of combustion or resulting gases:

In case of fire, the following can be released:

Barium oxide

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures**Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Additional information:

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage**Handling****Information for safe handling:**

Handle under dry protective gas.

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires:

The product is not flammable

Storage**Requirements to be met by storerooms and receptacles:**

No special requirements.

Information about storage in one common storage facility:

Store away from air.

Do not store together with acids.

Further information about storage conditions:

Store under dry inert gas.

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

This product is air sensitive.

USA

(Contd. on page 3)

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Barium hydroxide

(Contd. of page 2)

8 Exposure controls and personal protection**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Barium, and soluble compounds, as Ba

mg/m³

ACGIH TLV	0.5; Not classified as a human carcinogen
Austria MAK	0.5
Belgium TWA	0.5
Denmark TWA	0.5
Finland TWA	0.5
Germany MAK	0.5 (total dust)
Hungary	0.5-STEEL
Ireland TWA	0.5
Korea TLV	0.5
Netherlands MAC-TGG	0.5
Norway TWA	0.5
Poland TWA	0.5; 1.5-STEEL
Sweden TWA	0.5
Switzerland MAK-W	0.5
United Kingdom LTEL	0.5
USA PEL	0.5

Additional information: No data

Personal protective equipment**General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Breathing equipment:

Use suitable respirator when high concentrations are present.

Protection of hands:

Check protective gloves prior to each use for their proper condition.

Impervious gloves

Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties:**General Information**

Form:	Crystalline
Color:	White
Odor:	Odorless

Change in condition

Melting point/Melting range:	78°C (172°F)
Boiling point/Boiling range:	Not determined
Sublimation temperature / start:	Not determined

(Contd. on page 4)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Barium hydroxide

(Contd. of page 3)

Flash point:	Not applicable
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined
Upper:	Not determined
Vapor pressure:	Not determined
Density at 20°C (68°F):	2.18 g/cm ³
Solubility in / Miscibility with Water:	Soluble

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:

Decomposition will not occur if used and stored according to specifications.

Materials to be avoided:

Air

Acids

Dangerous reactions No dangerous reactions known

Dangerous products of decomposition: Barium oxide

11 Toxicological information

Acute toxicity:

Primary irritant effect:

on the skin: Irritant to skin and mucous membranes.

on the eye: Irritating effect.

Sensitization: No sensitizing effects known.

Subacute to chronic toxicity:

Barium compounds may cause severe gastroenteritis, including abdominal pain, vomiting and diarrhea, tremors, faintness, paralysis of the arms and legs, and slow or irregular heartbeat. Severe cases may produce collapse and death due to respiratory failure. Soluble barium compounds are more likely to cause these effects than insoluble compounds.

Inhalation of fumes may cause sore throat, coughing, labored breathing, and irritation of the respiratory tract as well as the above symptoms.

Subacute to chronic toxicity:

Corrosive materials are acutely destructive to the respiratory tract, eyes, skin and digestive tract. Eye contact may result in permanent damage and complete vision loss. Inhalation may result in respiratory effects such as inflammation, edema, and chemical pneumonitis. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Ingestion may cause damage to the mouth, throat and esophagus.

May cause skin burns or irritation depending on the severity of the exposure.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

(Contd. on page 5)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Barium hydroxide

(Contd. of page 4)

EPA-NL: Not likely to be carcinogenic to humans.
 EPA-D: Not classifiable as to human carcinogenicity: inadequate human and animal evidence of carcinogenicity or no data are available.
 ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

12 Ecological information:

General notes:

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
 Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

Product:

Recommendation

Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

DOT regulations:



Hazard class: 8
 Identification number: UN3262
 Packing group: III
 Proper shipping name (technical name): CORROSIVE SOLID, BASIC, INORGANIC, N.O.S. (Barium hydroxide)
 Label: 8

Land transport ADR/RID (cross-border)



ADR/RID class: 8 (C6) Corrosive substances
 Danger code (Kemler): 80
 UN-Number: 3262
 Packaging group: III

(Contd. on page 6)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Barium hydroxide

(Contd. of page 5)

Description of goods: 3262 CORROSIVE SOLID, BASIC, INORGANIC,
N.O.S. (Barium hydroxide)

Maritime transport IMDG:

IMDG Class: 8
UN Number: 3262
Label 8
Packaging group: III
Proper shipping name: CORROSIVE SOLID, BASIC, INORGANIC,
N.O.S. (Barium hydroxide)

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class: 8
UN/ID Number: 3262
Label 8
Packaging group: III
Proper shipping name: CORROSIVE SOLID, BASIC, INORGANIC,
N.O.S. (Barium hydroxide)

15 Regulations**Product related hazard informations:****Hazard symbols:**

Xn Harmful

Risk phrases:

20/22 Harmful by inhalation and if swallowed.

Safety phrases:

28 After contact with skin, wash immediately with plenty of water

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:

For use only by technically qualified individuals.

This product contains barium and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

USA

(Contd. on page 7)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Barium hydroxide

(Contd. of page 6)

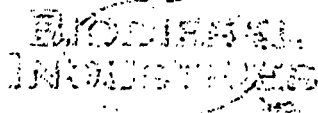
16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Darrell R. Sanders

— USA —



MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT IDENTIFICATION

Common Name: Biodiesel
Chemical Name: Fatty Acid Methyl Ester
Formula: C14-C24 Methyl Esters
Chemical Family: CAS No. 67784-80-9

SECTION 2 - INGREDIENTS AND HAZARDOUS CLASSIFICATION

Typical Composition:

Alkyl C14-C24 Methyl Esters	OSHA PEL	ACGIH/TLV	Percent
	none	none	99

This product contains no hazardous materials.
SARA Title III, Section 313: Not Listed

SECTION 3 - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: >400° F
Vapor Pressure (mm Hg): <5 mm Hg @ 72° F
Evaporation Rate: less than .005 versus (Butyl Acetate = 1)
Solubility in Water: insoluble
Appearance and Odor: light to dark yellow clear liquid / light musty odor

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Flash Point (method used): 321° F PMCC
Flammable Limits: N/A
HMIS Rating: Health: 0 Fire: 1 Reactivity: 0
Extinguishing Media: Use water spray, dry chemical, foam or carbon dioxide.
Special Fire Fighting Procedures: Treat as oil fire.
Unusual Fire and Explosion hazards: Rags soaked with any solvent present a fire hazard and should be stored in an approved UL listed covered container.

- PAGE 1 OF 2 -

SECTION 5 - REACTIVITY DATA

Reactivity: Stable

Conditions to Avoid: Non Known

Incompatibility (materials to avoid): Strong oxidizing agents

Hazardous Decomposition or By-products: Carbon monoxide, carbon dioxide

Hazardous Polymerization: Will not occur

SECTION 6 - HEALTH HAZARD DATA

Emergency First Aid Procedures:

Ingestion: Rinse mouth with water, contact physician

Eyes: Rinse with water 15 minutes, contact physician

Skin: Rinse with soap and water

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case material is released or spilled:

Avoid uncontrolled releases. Contain spilled material. Transfer to secure containers. Use absorbent material if necessary.

Disposal: Dispose of according to Federal, state and/or local regulations

Precautions to be Taken in Handling and Storing: Avoid open flames

Other Precautions: None

SECTION 8 - CONTROL MEASURES

Respiratory Protection: None required

Ventilation: mechanical

Protective Gloves: Rubber

Eye Protection: Safety glasses / splash goggles

Other Protective Clothing or Equipment: None required

SECTION 9 - TRANSPORTATION

DOT Code: N/A

DOT Shipping Name: Fatty acid esters

Other Regulatory: Listed in TSCA inventory

The information provided is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability, or suitability for an intended use, or any other warranty, expressed or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes

BIODIESEL INDUSTRIES, INC.

111 SAGUARO LANE, MARATHON, FL 33050 • 305-743-3942 • FAX 305-743-3943

ONLINE AT [HTTP://WWW.PIPELINE.TO/BIODIESEL](http://www.PIPELINE.TO/BIODIESEL) • EMAIL RTEALL@AOL.COM

- PAGE 2 OF 2 -

Documents

Document Title	Category	Document Date	Document Type	Action Type
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1. MSDS Sheet for Biodiesel

MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: AccuStandard, Inc.
125 Market Street
New Haven, CT 06513

Date MSDS Printed: 6/20/2007
Preparation Date: 2/10/2006
Information Phone Number: 203-786-5290
Emergency Phone Number: 203-786-5290
Hours: Mon. to Fri. 8am-5pm

Catalog Number: PS-151C-04

Product Name: 1,3-Butanediol

Synonyms: 1,3-Butanediol; Butane-1,3-diol; Butylene glycol; 1,3-Dihydroxybutane; Methyltrimethylene glycol

Formula: $C_4H_{10}O_2$

Molecular Weight: 90.12

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Component(s)	(I)	CAS #	Appr. %	ACGIH-TLV (mg/m3)		OSHA-PEL (mg/m3)	
				TWA	STEL skin	TWA	STEL skin
1,3-Butanediol		107-88-0	100				

SECTION 3 - HAZARDS IDENTIFICATION

Symptoms of Exposure:

May be irritating to eyes, skin, mucous membranes and upper respiratory system.

To the best of our knowledge the chemical, physical and toxicological properties of the component ingredients have not been thoroughly investigated.

Potential Health Effects:

May be harmful if inhaled, absorbed through the skin, or swallowed.

Routes of Entry:

Inhalation, ingestion or skin contact.

Catalog Number:
PS-151C-04

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written permission from AccuStandard strictly prohibited.

Page 1
Preparation Date: 2/10/2006

For full page MSDS please visit www.accustandard.com

Carcinogenicity:

This product is or contains a component that is not listed (ACGIH, IARC, NTP, OSHA) as a cancer causing agent.

SECTION 4 - FIRST AID MEASURES

Emergency First Aid:

Get medical assistance for all cases of overexposure.

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

Ingestion: Drink water and induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: 226.4 °F (108 °C)

Flammable Limits LEL (%): 1.9

Flammable Limits UEL (%): N/A

Autoignition Temperature: 394 °C

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media:

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Fire Fighting Procedures:

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response:

Wear a self-contained breathing apparatus and appropriate Personal protection. Prevent contact with skin or eyes. Ventilate area. Stop leak if you can do so without risk. Absorb on sand or vermiculite, take up and containerize for proper disposal. Flush spill area with water. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container.

Store in a cool area away from ignition sources and oxidizers.

Material is hygroscopic.

Do not breathe vapor.

Do not get in eyes, on skin or clothing.

Avoid prolonged or repeated exposure.

This product should only be used by persons trained in the safe handling of hazardous chemicals.

Catalog Number:
PS-151C-04

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Page 2
Preparation Date: 2/10/2006

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EPAP005000643

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls and Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Compatible chemical-resistant protective gloves must be worn to prevent skin contact.

Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid

Odor: N/A

pH: 6.0 - 7.0 (20 °C)

Vapor Pressure: 0.06 mmHg (20 °C)

Vapor Density (Air = 1): 3.1 g/l

Boiling Point: 204 - 207 °C

Melting Point: N/A

Solubility in Water (%): N/A

Specific Gravity (H₂O = 1): 1.004 g/cm³

Flash Point: 226.4 °F (108 °C) (cc)

Explosion Limits (%): 1.9 to N/A

Autoignition Temperature: 394 °C

Percent Volatile: N/A

Evaporation Rate (BuAc = 1): N/A

Molecular Weight: 90.12

Molecular Formula: C₄H₈O₂

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions To Avoid: Moisture

Materials To Avoid: Oxidizers

Acid chlorides; Acid anhydrides; Chloroformates; Reducing agents

Hazardous Decomposition: Carbon oxides

Hazardous Polymerization:

Catalog Number:

PS-151C-04

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Preparation Date: 2/10/2006

Page 3

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SECTION 11 - TOXICOLOGICAL INFORMATION

See section 3 for specific toxicological information for the ingredients of this product.

SECTION 12 - ECOLOGICAL INFORMATION

By complying with sections 6 and 7 there will be no release to the environment.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT UN Number: NR Shipping Class: NR Packing Group: NR IRRITANT

SECTION 15 - REGULATORY INFORMATION

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make

NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend: N/A = Not Available ND = Not Determined NR = Not regulated

*** End of Document ***

Catalog Number:

PS-151C-04

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Preparation Date: 2/10/2006

Page 4

For full page MSDS please visit www.accustandard.com



Material Safety Data Sheet



MSDS DATE: February 22, 2000

PRODUCT NAME: BRINE SOLUTION

24-Hour Emergency Phone Number: 713-433-4595

I. PRODUCT IDENTIFICATION

HMIS HAZARD RATING: HEALTH = 1 FIRE = 0 REACTIVITY = 0

MANUFACTURER: Texas Brine Company, L.L.C.
Pierce Junction
3000 Feldmon Road
Houston, Texas 77045

Corporate
4800 San Felipe
Houston, Texas 77056
1-800-554-8689

Chemical name: Sodium Chloride
CAS: 7647-14-5
Synonyms: Sodium Chloride solution, brine
Chemical Formula: NaCl

II. HEALTH HAZARD INFORMATION

Emergency and First Aid

EYES: Immediately flush eyes with direct stream of water for at least 20 minutes holding the eyelids open. If irritation occurs, seek medical attention.

SKIN: Wash with soap and water.

INHALATION: If symptoms develop, remove person to fresh air.

INGESTION: Never give anything by mouth to an unconscious person. Have person drink several glasses of water then induce vomiting. Seek medical attention immediately.

ROUTES OF EXPOSURE

Inhalation – None expected

Skin – Exposure to spray or liquid may cause irritation of skin.

Eye contact – Exposure to spray or liquid may cause irritation of eyes.

BRINE SOLUTION

Ingestion – Ingestion of large amounts may cause irritation of the stomach vomiting and diarrhea. Serious salt poisoning in humans has occurred from both accidental and deliberate ingestion.

Effects of Overexposure

Acute: May cause irritation to skin eyes and digestive tract.

Chronic: Not determined

III. HAZARDOUS COMPONENTS

Component	CAS	OSHA-PEL	ACGIH-TLV	%
Sodium Chloride	7647-14-5	Not established	Not established	24 - 26

This product may contain trace concentrations of petroleum hydrocarbon constituents, including benzene. Laboratory analysis is available upon request.

IV. FIRE & EXPLOSION DATA

Flash point: Not applicable

Autoignition temperature: Not applicable

Flammable limits:

Upper Not applicable

Lower Not applicable

Extinguishing Media: Use agent suitable for surrounding fire. Water, water fog, dry chemical, CO₂, sand or dirt may be used where this product is stored.

Special Fire Fighting Procedures: Non-flammable.

Unusual fire and explosion hazard: Not combustible. No unusual hazards.

V. SPECIAL PROTECTION

Ventilation Requirements: Ventilation is not normally required for salt solutions. Avoid creation of mist or spray. If present, wear appropriate safety clothing and provide local exhaust systems.

Respiratory: Provide mist protection where applicable. Use NIOSH/MSHA approved respirators. Follow requirements of 29 CFR 1910.134.

BRINE SOLUTION

Eye: Wear safety glasses with side shields or chemical goggles where splash hazard exists.

Gloves: Use rubber, vinyl, or neoprene gloves.

Other equipment: Eyewash facility and emergency shower should be in close proximity.

VI. PHYSICAL DATA

Boiling point:	~218 ° F
Freezing point::	Not determined
Vapor pressure:	Not determined
Specific gravity:	1.19 – 1.20
Solubility in water:	26 %
Vapor density:	Not determined
Appearance and odor:	Clear to hazy liquid with a salty odor
pH:	7.2 – 7.5

VII. REACTIVITY DATA

Conditions contributing to instability: Under normal conditions, the material is stable.

Incompatibility: Avoid contact with strong concentrations of mineral acids; sulfuric acid, nitric acid.

Hazardous decomposition products: Hydrogen chloride gas is released on contact with strong mineral acids.

Hazardous polymerization: Will not occur.

VIII. HANDLING & STORING

Precautions: Store in an area that is separate from strong mineral acids. Dike and vent storage tank. Use protective safety equipment as appropriate.

IX. ENVIRONMENTAL PROCEDURES

Spill or release: Contain spill to prevent flow to sewers and streams. Pump into marked container for disposal or reclamation. Brine solutions (salt water) may be fatal to fresh water species. Brine may cause corrosion of metal components.

Waste disposal method: Dispose of spilled material in licensed landfill or as appropriate in accordance with federal, state, and local regulations.

BRINE SOLUTION

X. REGULATORY

All components listed on TSCA: Yes
DOT Proper shipping name: Not regulated
SARA /Title III: Not listed

OSHA regulation 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, and training.

XI. REVISION

February 22, 2000

1. Update of site specific information
2. Supersedes 1997 Version

The information herein is given in good faith but no warranty expressed or implied is made.



Material Safety Data Sheet

Section 1. Product and Company Identification

Product Name Butyl Alcohol Product Code B10061

Manufacturer EMD Chemicals Inc.
P.O. Box 70
480 Democrat Road
Gibbstown, NJ 08027
Prior to January 1, 2003 EMD
Chemicals Inc. was EM
Industries, Inc. or EM Science,
Division of EM Industries, Inc.

Effective Date 2/22/2005

For More Information Call
856-423-6300 Technical Service
Monday-Friday: 8:00 AM - 5:00 PM

In Case of Emergency Call
800-424-9300 CHEMTREC (USA)
613-996-6666 CANUTEC (Canada)
24 Hours/Day: 7 Days/Week

Synonym N-1-BUTANOL
Material Uses Analytical reagent.
Chemical Aliphatic alcohol.
Family

Section 2. Composition and Information on Ingredients

Component	CAS #	% by Weight
1-Butanol	71-36-3	100

Section 3. Hazards Identification

Physical State and Appearance Liquid. (Colorless.)

Emergency Overview	WARNING! FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF INHALED OR SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CAUSES DAMAGE TO THE FOLLOWING ORGANS: MUCOUS MEMBRANES, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.
Routes of Entry	Inhalation. Ingestion.
Potential Acute Health Effects	<p>Eyes Hazardous in case of eye contact (irritant). Inflammation of the eye is characterized by redness, watering, and itching.</p> <p>Skin Hazardous in case of skin contact (irritant). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Non-permeator by skin.</p> <p>Inhalation Hazardous in case of inhalation (lung irritant).</p> <p>Ingestion Hazardous in case of ingestion.</p>
Potential Chronic Health Effects	
Carcinogenic Effects	This material is not known to cause cancer in animals or humans.
	Additional information See Toxicological Information (section 11)
Medical Conditions Aggravated by Overexposure:	Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Section 5. Fire Fighting Measures

Flammability of the Product	Product will burn.
Auto-ignition Temperature	342.9°C (649.2°F)
Flash Points	Closed cup: 28.9°C (84°F).
Flammable Limits	LOWER: 1.4% UPPER: 11.2%

Products of Combustion	These products are carbon oxides (CO, CO ₂).
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks and static discharge, of heat, of oxidizing materials.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of static discharge: Flammable in presence of open flames, sparks and static discharge. Risks of explosion of the product in presence of mechanical impact: No.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Protective Clothing (Fire)	Be sure to use an approved/certified respirator or equivalent.
Special Remarks on Fire Hazards	Vapor may travel considerable distance to source of ignition and flash back.
Special Remarks on Explosion Hazards	Not available.

Section 6. Accidental Release Measures

Small Spill and Leak	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.
Large Spill and Leak	Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.
Spill Kit Information	The following EMD Chemicals Inc. SpillSolv [®] absorbent is recommended for this product: SX1330 Solvent Treatment Kit

Section 7. Handling and Storage

Handling	Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Do not ingest. Do not get in eyes, on skin, or on clothing.
Storage	Keep container in a cool, well-ventilated area.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	Eyes Splash goggles. Body Lab coat.

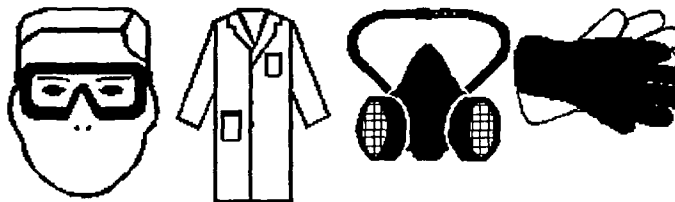
Respiratory Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

Wear appropriate respirator when ventilation is inadequate.

Hands Gloves.

Feet Not applicable.

**Protective
Clothing
(Pictograms)**



**Personal Protection
in Case of a Large
Spill**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist **BEFORE** handling this product.

Product Name

1-Butanol

Exposure Limits

BAUA (Germany, 1997).

Spitzenbegrenzung: 1200 mg/m³

Spitzenbegrenzung: 400 ppm

TWA: 300 mg/m³ 8 hour(s).

TWA: 100 ppm 8 hour(s).

DK-Arbejdstylsinet (Denmark, 1996). Skin

Loftværdi: 150 mg/m³

Loftværdi: 50 ppm

GV: 150 mg/m³ 8 hour(s).

GV: 50 ppm 8 hour(s).

National Authority for Occupational Safety/Health (Ireland, 1999). Skin

STEL: 150 mg/m³ 15 minute(s).

STEL: 50 ppm 15 minute(s).

EH40-OES (United Kingdom (UK), 1997). Skin

STEL: 154 mg/m³ 15 minute(s).

STEL: 50 ppm 15 minute(s).

ACGIH (United States, 1994). Skin

CEIL: 152 mg/m³

CEIL: 50 ppm

NIOSH REL (United States, 1994). Skin

CEIL: 150 mg/m³

CEIL: 50 ppm

OSHA Final Rule (United States, 1989). Skin

CEIL: 150 mg/m³

CEIL: 50 ppm

Section 9. Physical and Chemical Properties

Odor	Alcohol like.
Color	Colorless. Clear.
Physical State and Appearance	Liquid. (Colorless.)
Molecular Weight	74.14 g/mole
Molecular Formula	C ₄ H ₁₀ O

pH	Not available.
Boiling/Condensation Point	117.83°C (244.1°F)
Melting/Freezing Point	-88.83°C (-127.9°F)
Critical Temperature	289.9°C (553.8°F)
Specific Gravity	0.81 (Water = 1)
Vapor Pressure	Not available.
Vapor Density	2.6 (Air = 1)
Odor Threshold	25 ppm
Evaporation Rate	0.44 compared to(n-BUTYL ACETATE=1)
LogKow	Not available.
Solubility	Partially soluble in water.

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Reactive with metals, acids, alkalis.
Rem/Incompatibility	Not available.
Hazardous Decomposition Products	carbon oxides (CO, CO2)
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

RTECS Number:	Butyl Alcohol	EO1400000
Toxicity	Acute oral toxicity (LD50): 790 mg/kg [Rat]. Acute dermal toxicity (LD50): 3400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 8000 ppm 4 hour(s) [Rat].	
Chronic Effects on Humans	Not available.	
Acute Effects on Humans	Hazardous in case of eye contact (irritant). Inflammation of the eye is characterized by redness, watering, and itching. Hazardous in case of skin contact (irritant). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Non-permeator by skin. Hazardous in case of inhalation (lung irritant). Hazardous in case of ingestion.	
Synergetic Products Toxicologically)	Not available.	

Irritancy	Draize Test (Rabbit): Skin: 20mg/24h. Reaction: Moderate. Eye: 2 mg/24H Severe
Sensitization	Not available.
Carcinogenic Effects	This material is not known to cause cancer in animals or humans.
Toxicity to Reproductive System	Tests on laboratory animals for reproductive effects are cited in Registry of Toxic Effects on Chemical Substances (RTECS).
Teratogenic Effects	Not available.
Mutagenic Effects	Tests on laboratory animals for mutagenic effects are cited in Registry of Toxic Effects of Chemical Substances (RTECS).

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

EPA Waste Number	U031 D001
Treatment	Incineration, fuels blending or recycle. Contact your local permitted waste disposal site (TSD) for permissible treatment sites. Always contact a permitted waste disposal (TSD) to assure compliance with all current local, state, and Federal Regulations.

Section 14. Transport Information

DOT Classification	Proper Shipping Name: BUTANOL Hazard Class: 3 UN number: UN1120 Packing Group: III RQ: 5000 lbs. (2268 kg)
TDG Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

U.S. Federal Regulations	TSCA 4(a) final test rules: 1-Butanol TSCA 8(b) inventory: 1-Butanol TSCA 12(b) one time export: 1-Butanol
---------------------------------	--

	SARA 302/304/311/312 extremely hazardous substances: No products were found.
	SARA 302/304 emergency planning and notification: No products were found.
	SARA 302/304/311/312 hazardous chemicals: 1-Butanol
	SARA 311/312 MSDS distribution - chemical inventory - hazard identification: 1-Butanol: Fire Hazard, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard
	SARA 313 toxic chemical notification and release reporting: 1-Butanol
	Clean Water Act (CWA) 307: No products were found.
	Clean Water Act (CWA) 311: No products were found.
	Clean air act (CAA) 112 accidental release prevention: No products were found.
	Clean air act (CAA) 112 regulated flammable substances: No products were found.
	Clean air act (CAA) 112 regulated toxic substances: No products were found.
WHMIS (Canada)	CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
	Class D-2B: Material causing other toxic effects (TOXIC).
	CEPA DSL: 1-Butanol
	This product has been classified in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all required information.
International Regulations	
EINECS	1-Butanol 200-751-6
DSCL (EEC)	R10- Flammable.
	R22- Harmful if swallowed.
	R37/38- Irritating to respiratory system and skin.
	R41- Risk of serious damage to eyes.
International Lists	Australia (NICNAS): 1-Butanol
	Japan (MITI): 1-Butanol
	Japan (MOL): 1-Butanol
	Korea (TCCL): 1-Butanol
	Philippines (RA6969): 1-Butanol
	China: No products were found.
State Regulations	Pennsylvania RTK: 1-Butanol: (environmental hazard, generic environmental hazard)
	Massachusetts RTK: 1-Butanol
	New Jersey: 1-Butanol
	California prop. 65: No products were found.

Section 16. Other Information

National	3	Fire
Fire	10	Hazard
Protection	Health	Reactivity
Association		Specific
(U.S.A.)		Hazard

Changed Since Last +
Revision

Notice to Reader

The statements contained herein are based upon technical data that EMD Chemicals Inc. believes to be reliable, are offered for information purposes only and as a guide to the appropriate precautionary and emergency handling of the material by a properly trained person having the necessary technical skills. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use, storage and disposal of these materials and the safety and health of employees and customers and the protection of the environment. EMD CHEMICALS INC. MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, WITH RESPECT TO THE INFORMATION HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

MATERIAL SAFETY DATA SHEET

R6K25
06 00

Section 1 -- PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

R6K25

HMIS CODES

Health	2
Flammability	2
Reactivity	0

PRODUCT NAME

Butyl Cellosolve

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION

02-JUL-06

INFORMATION TELEPHONE NO.
(216) 566-2902

Section 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

% by WT	CAS No.	INGREDIENT	UNITS	VAPOR PRESSURE
100	111-76-2	2-Butoxyethanol		
		ACGIH TLV	20 ppm	0.88 mm
		OSHA PEL	25 ppm	

Section 3 -- HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.

EYE or SKIN contact with the product, vapor or spray mist.

Contains alcohols and acetates which can be absorbed through the skin.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

Continued on page 2

EPAPA005000657

=====
Section 4 -- FIRST AID MEASURES
=====

EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing.
Keep warm and quiet.

INGESTION: Do not induce vomiting.
Get medical attention immediately.

=====
Section 5 -- FIRE FIGHTING MEASURES
=====

FLASH POINT	LEL	UEL
143 F PMCC	1.1	10.6

FLAMMABILITY CLASSIFICATION

Combustible, Flash above 99 and below 200 F

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

=====
Section 6 -- ACCIDENTAL RELEASE MEASURES
=====

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

=====
Section 7 -- HANDLING AND STORAGE
=====

STORAGE CATEGORY

DOL Storage Class IIIA

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are COMBUSTIBLE. Keep away from heat and open flame.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Continued on page 3

=====
Section 8 -- EXPOSURE CONTROLS/PERSONAL PROTECTION
=====

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use of barrier cream on exposed skin is recommended.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

=====
Section 9 -- PHYSICAL AND CHEMICAL PROPERTIES
=====

PRODUCT WEIGHT	7.49 lb/gal	897 g/l
SPECIFIC GRAVITY	0.90	
BOILING POINT	325 - 343 F	162 - 172 C
MELTING POINT	Not Available	
VOLATILE VOLUME	100 %	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS	(VOC Theoretical - As Packaged)	
7.49 lb/gal	897 g/l	Less Water and Federally Exempt Solvents
7.49 lb/gal	897 g/l	Emitted VOC

=====
Section 10 -- STABILITY AND REACTIVITY
=====

STABILITY -- Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

Continued on page 4

=====
Section 11 -- TOXICOLOGICAL INFORMATION
=====

CHRONIC HEALTH HAZARDS

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen.

Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver, urinary and blood forming systems.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

=====

TOXICOLOGY DATA

CAS No.	Ingredient Name
---------	-----------------

111-76-2	2-Butoxyethanol
	LC50 RAT 4HR Not Available
	LD50 RAT 470 mg/kg

=====
Section 12 -- ECOLOGICAL INFORMATION
=====

ECOTOXICOLOGICAL INFORMATION

No data available.

=====
Section 13 -- DISPOSAL CONSIDERATIONS
=====

WASTE DISPOSAL METHOD

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

=====
Section 14 -- TRANSPORT INFORMATION
=====

No data available.

=====
Section 15 -- REGULATORY INFORMATION
=====

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
	Glycol Ethers	100	

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

=====
Section 16 -- OTHER INFORMATION
=====

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Continued on page 5

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

999-001455



THE DOW CHEMICAL COMPANY MATERIAL SAFETY DATA SHEET



Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 1 of 15

Dow (hereinafter, and for purposes of this MSDS only, refers to The Dow Chemical Company and to Dow Chemical Canada Inc.) encourages and expects you to read and understand the entire MSDS, as there is important information throughout the document. Dow expects you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 IDENTIFICATION

Product Name BUTYL CELLOSOLVE(TM) ACETATE

1.2 COMPANY IDENTIFICATION

The Dow Chemical Company
Midland, MI 48674

1.3 EMERGENCY TELEPHONE NUMBER

24-HOUR EMERGENCY TELEPHONE NUMBER: (989)636-4400.
Customer Information Number: 1-800-258-2436.

* or ® Indicates a Trademark of The Dow Chemical Company.

EPAPA005000662

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 2 of 15

2. COMPOSITION INFORMATION

Component	CAS #	Amount (%W/W)
Ethylene glycol butyl ether acetate	112-07-2	>= 99 <= 100%

3. HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Appearance Colorless

Physical State Liquid

Odor Ethereal, Fruity

Hazards of product COMBUSTIBLE LIQUID AND VAPOR.
MAY CAUSE EYE IRRITATION.
MAY BE HARMFUL IF ABSORBED THROUGH SKIN.

ISOLATE AREA.

3.2 POTENTIAL HEALTH EFFECTS

Effects of Single Acute Overexposure

Inhalation Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Prolonged excessive exposure to mist may cause serious adverse effects, even death.

Eye Contact May cause slight eye irritation. Effects may include discomfort and redness. Vapor or mist may cause eye irritation.

Skin Contact Prolonged contact is essentially nonirritating to skin.

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 3 of 15

Skin Absorption Prolonged or widespread skin contact may result in absorption of potentially harmful amounts.

Swallowing Low toxicity if swallowed. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Chronic, Prolonged or Repeated Overexposure

Other Effects of Overexposure No information available.

See Section 11 for toxicological information and additional information about potential health effects.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Section 12 for Ecological Information.

4. FIRST AID PROCEDURES

4.1 INHALATION

Move person to fresh air; if effects occur, consult a physician.

4.2 EYE CONTACT

Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

4.3 SKIN CONTACT

Immediately flush skin with water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Discard contaminated articles including leather items such as shoes.

4.4 SWALLOWING

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

4.5 NOTES TO PHYSICIAN

Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress.

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 4 of 15

No specific antidote.

Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES - REFER TO SECTION 9, PHYSICAL AND CHEMICAL PROPERTIES

5.2 EXTINGUISHING MEDIA

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

5.3 FIRE FIGHTING PROCEDURES

Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

5.4 SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

5.5 UNUSUAL FIRE AND EXPLOSION HAZARDS

Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

5.6 HAZARDOUS COMBUSTION PRODUCTS

During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material Is Released or Spilled:

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 5 of 15

Contain spilled material if possible. Collect in suitable and properly labeled containers. Dilute with large quantities of water. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling for additional precautionary measures.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. HANDLING AND STORAGE

7.1 HANDLING

General Handling

Keep away from heat, sparks and flame.

Avoid prolonged contact with eyes, skin and clothing.

Wash thoroughly after handling.

Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers.

Ventilation

Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Use only with adequate ventilation.

Other Precautions

Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

7.2 STORAGE

Store in the following material(s): carbon steel. stainless steel. high-baked, phenolic-lined tanks. Do not store in: Aluminum. Copper. galvanized iron. galvanized steel. Viton. neoprene. nitrile. natural rubber.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 EXPOSURE LIMITS

Component	Exposure Limits	Skin	Form
------------------	------------------------	-------------	-------------

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 6 of 15

|| Ethylene glycol butyl ether 20 ppm TWA8 ACGIH
|| acetate

In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled.

A "Yes" in the Skin Column indicates a potential significant contribution to overall exposure by the cutaneous (skin) route, including mucous membranes and the eyes, either by contact with vapors or by direct skin contact with the substance. A "Blank" in the Skin Column indicates that exposure by the cutaneous (skin) route is not a potential significant contributor to overall exposure.

8.2 PERSONAL PROTECTION

**Respiratory
Protection:**

Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration.

For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure airline with auxiliary self-contained air supply.

Ventilation:

Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

Use only with adequate ventilation.

Eye Protection:

Use safety glasses.

If exposure causes eye discomfort, use a full-face respirator.

**Other Protective
Equipment:**

Use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full body suit will depend on operation.

Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly.

Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 7 of 15

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Colorless

Odor: Ethereal, Fruity

Flash Point - Closed Cup: 74 °C 165 °F , Tag Closed Cup ASTM D 56

Flammable Limits In Air:

Lower 0.5 %(V)
Upper 8.54 %(V) 135 °C, 275 °F

Autoignition Temperature: No test data available.

Vapor Pressure: 0.2 mmHg 20 °C

Boiling Point (760 mmHg): 192 °C 377 °F

Vapor Density (air = 1): 6

Specific Gravity (H2O = 1): 0.972 20 °C / 20 °C

Freezing Point: -64 °C -83 °F

Melting Point: Not applicable.

Solubility in Water (by weight): 2 % 20 °C

pH: No test data available.

Molecular Weight: 160 g/mol

Octanol/Water Partition Coefficient - Measured: , 1.51 - 1.79

Octanol/Water Partition Coefficient - Calculated by Structural Fragment Method:
1.57

Evaporation Rate (Butyl Acetate = 1): 0.04

Percent Volatiles: 100 Wt%

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 8 of 15

10. STABILITY AND REACTIVITY

10.1 STABILITY/INSTABILITY Thermally stable at typical use temperatures.

Conditions to Avoid: Product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Thermal Decomposition: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

10.2 HAZARDOUS POLYMERIZATION Will not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Peroral

Rat; LD50 = 7250 mg/kg

Percutaneous

Rabbit; LD50 = 1540 mg/kg

CHRONIC TOXICITY AND CARCINOGENICITY

CARCINOGENICITY CLASSIFICATIONS

Component	Agency	Classification
------------------	---------------	-----------------------

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 9 of 15

Ethylene glycol butyl ether acetate ACGIH

A3: Confirmed Animal Carcinogen
with Unknown Relevance to
Humans

12. ECOLOGICAL INFORMATION

12.1 ENVIRONMENTAL FATE

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. The rate constant for the vapor phase reaction with photochemically produced hydroxyl radicals at 25°C is estimated to be: 2.12×10^{-11} cm³/molecule-sec. at 25°C. Material is ultimately biodegradable. Reaches > 70% mineralization in OECD test(s) for inherent biodegradability. Biodegradation reached in Modified Zahn-Wellens/EMPA Test (OECD Test No. 302 B) after 28 days: 77 - 90%. Mean degradation reached in Continuous Activated Sludge assay (OECD Test No. 303 A): 96.7% in 3 hr. Biodegradation reached in Modified MITI Test (I) (OECD Test No. 301 C) after 28 days: 88%.

BOD (% Oxygen consumption)

	Day 5	Day 10	Day 15	Day 20	Day 28/30
	53 %	69 - 80 %		72 - 80 %	

12.2 ECOTOXICITY

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested). Inhibitory concentration (IC50) in OECD Activated Sludge Respiration Inhibition Test (OECD Test No. 209) is: 900 mg/L in 30 min., The 16-h growth inhibition EC50 in bacteria is: 2800 mg/L.

Toxicity to Aquatic Invertebrates

water flea (Daphnia magna); Acute LC50

Result value: 140 mg/L

Toxicity to Aquatic Invertebrates

water flea (Daphnia magna); Acute immobilization EC50

Result value: (37 - 180) mg/L

Toxicity to Aquatic Plants

alga (Scenedesmus sp.); Growth inhibition; EC50

Result value: > 500 mg/L

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 10 of 15

Toxicity to Fish

fathead minnow (*Pimephales promelas*); Acute LC50

Result value: 22 - 31 mg/L

Toxicity to Fish

golden orfe (*Leuciscus idus*); Acute LC50

Result value: 80 mg/L

12.3 FURTHER INFORMATION

Bioconcentration potential is low ($BCF < 100$ or $\text{Log Pow} < 3$). Potential for mobility in soil is very high (K_{oc} between 0 and 50). Soil organic carbon/water partition coefficient (K_{oc}) is estimated to be: 26-224 Henry's Law Constant (H) is estimated to be: $5.27 \text{ E-}06 \text{ atm-m}^3/\text{mole}$ at 25°C.

Theoretical Oxygen Demand (THOD) - calculated:: 2.10 mg/mg

Octanol/Water Partition Coefficient - Measured: , 1.51 - 1.79

Octanol/Water Partition Coefficient - Calculated by Structural Fragment Method: 1.57

13. DISPOSAL CONSIDERATIONS

13.1 DISPOSAL

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/ Information on Ingredients). FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details .

14. TRANSPORT INFORMATION

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 11 of 15

14.1 U.S. D.O.T.

NON-BULK

Proper Shipping Name : NOT REGULATED

BULK

Proper Shipping Name : COMBUSTIBLE LIQUID, NOS

Technical Name : ETHYLENE GLYCOL MONOBUTYL ETHER ACETATE

Hazard Class : COMBUSTIBLE LIQUID

ID Number : NA1993

Packing Group : PG III

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

15.1 FEDERAL/NATIONAL

OSHA HAZARD COMMUNICATION:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act 1986 and 40 CFR Part 372.

Component	CAS #	Amount
Glycol Ethers	Not available	<= 100.0000%

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 12 of 15

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA) SECTION 103

This product contains the following substances subject to CERCLA Section 103 reporting requirements and are listed in 40 CFR Part 302.4.

Component	CAS #	Amount
Ethylene glycol monoethyl ether	110-80-5	<= 0.0100%
Acetic acid	64-19-7	<= 0.0006%

In addition, this product contains other Glycol Ether(s) which, although included as a broad category on the CERCLA hazardous substance list, has not been assigned a reportable quantity.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTION 302

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTIONS 311 AND 312

Delayed (Chronic) Health Hazard : No
Fire Hazard : Yes
Immediate (Acute) Health Hazard : Yes
Reactive Hazard : No
Sudden Release of Pressure Hazard : No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)

The components of this product are on the EINECS inventory or are exempt from EINECS inventory requirements.

CEPA - DOMESTIC SUBSTANCES LIST (DSL)

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 13 of 15

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

15.2 STATE/LOCAL

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT TO KNOW ACT): PENNSYLVANIA HAZARDOUS SUBSTANCES LIST AND/OR PENNSYLVANIA ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Glycol Ethers	Not available	<= 100.0000%

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT TO KNOW ACT): PENNSYLVANIA SPECIAL HAZARDOUS SUBSTANCES LIST:

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

WARNING: This product contains a chemical(s) known to the State of California to cause birth defects or other reproductive harm.

Component	CAS #	Amount
Ethylene glycol monoethyl ether	110-80-5	<= 0.0100%
Ethylene glycol monoethyl ether acetate	111-15-9	<= 0.0060%

CALIFORNIA SCAQMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 443.1, LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

VOC: Vapor pressure 0.2 mmHg @ 20° C
953 g/l
953 g/l less water and less exempted solvents

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 14 of 15

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

16. OTHER INFORMATION

16.1 ADDITIONAL INFORMATION

Additional information on this and other Dow products may be obtained by visiting our web page at www.dow.com.

Additional information on this product may be obtained by calling Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada).

16.2 HAZARD RATING SYSTEM

NFPA ratings for this product are: H - 2 F - 2 R - 0

These ratings are part of a specific hazard communication program and should be disregarded where individuals are not trained in the use of this hazard rating system. You should be familiar with the hazard communication programs applicable to your workplace.

16.3 RECOMMENDED USES AND RESTRICTIONS

An oxygenated solvent-

For industrial consumption as a process raw material.

For industrial consumption as a component of a reaction system.

For industrial formulation for inclusion in a final product.

For industrial use as a process aid.

For industrial formulation as a process control material.

For industrial conversion as a raw material for manufacture of articles or goods.

For industrial use.

Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's stated use, please contact Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada) for more information.

MATERIAL SAFETY DATA SHEET

Product Name: BUTYL CELLOSOLVE(TM) ACETATE
MSDS#: 834

Effective Date: 07/15/2003
Page 15 of 15

16.4 REVISION

Version: 6.

Revision: 07/15/2003

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

16.5 LEGEND

Bacterial/NA	Non Acclimated Bacteria
F	Fire
H	Health
IHG	Industrial Hygiene Guideline
N/A	Not available
NFPA	National Fire Protection Association
O	Oxidizer
R	Reactivity
TS	Trade secret
VOL/VOL	Volume/Volume
W	Water Reactive
W/W	Weight/Weight

NOTICE: Dow urges each customer or recipient of this MSDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this MSDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given., Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that its activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of Dow, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product., Due to the proliferation of sources for information such as manufacturer-specific MSDSs, Dow is not and cannot be responsible for MSDSs obtained from any source other than Dow. If you have obtained a Dow MSDS from a non-Dow source or if you are not sure that a Dow MSDS is current, please contact Dow for the most current version.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 07/12/2006

Date Updated: 02/06/2006

Version 1.4

Section 1 - Product and Company Information

Product Name	BUTYL ETHER
Product Number	34460
Brand	FLUKA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
BUTYL ETHER	142-96-1	No
Formula	C8H18O	
Synonyms	1-Butoxybutane * Butyl ether * n-Butyl ether * Dibutyl ether * Di-n-butyl ether * n-Dibutyl ether * Dibutyl oxide * Ether butylique (French) * 1,1'-Oxybis(butane)	
RTECS Number:	EK5425000	

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable. Irritant.

Irritating to eyes, respiratory system and skin. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HMIS RATING

HEALTH: 2

FLAMMABILITY: 3

REACTIVITY: 1

NFPA RATING

HEALTH: 2

FLAMMABILITY: 3

REACTIVITY: 1

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give

artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS

Flammable Hazards: Yes
Peroxide Former: Yes

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT

77 °F 25 °C Method: closed cup

EXPLOSION LIMITS

Lower: 0.9 % Upper: 8.5 %

AUTOIGNITION TEMP

185 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

SPECIAL REQUIREMENTS

Store under inert gas. Air and light sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Liquid	
Property	Value	At Temperature or Pressure
Molecular Weight	130.23 AMU	
pH	5.2	
BP/BP Range	140.0 - 142.0 °C	
MP/MP Range	- 98.0 °C	
Freezing Point	N/A	
Vapor Pressure	4.8 mmHg	20 °C
Vapor Density	4.48 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.764 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	77 °F 25 °C	Method: closed cup
Explosion Limits	Lower: 0.9 % Upper: 8.5 %	

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

1 Identification of substance:**Product details:****Product name:** n-Butyl acetate**Stock number:** A19412**Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company
 Johnson Matthey Catalog Company, Inc.
 30 Bond Street

Ward Hill, MA 01835-8099

Emergency Phone: (978) 521-6300

CHEMTREC: (800) 424-9300

Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department**Emergency information:**

During normal hours the Health, Safety and Environmental Department.
 After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:**Chemical characterization:****Description: (CAS#)**

n-Butyl acetate (CAS# 123-86-4): 100%

Identification number(s):**EINECS Number:** 204-658-1**EU Number:** 607-025-00-1**3 Hazards identification****Hazard description:** Not applicable**Information pertaining to particular dangers for man and environment**

At long or repeated contact with skin it may cause dermatitis due to the degreasing effect of the solvent.

Causes a narcotic effect.

R 10 Flammable.

R 66 Repeated exposure may cause skin dryness or cracking

R 67 Vapours may cause drowsiness and dizziness

Classification system**HMIS ratings (scale 0-4)****(Hazardous Materials Identification System)**

HEALTH	1
FIRE	3
REACTIVITY	1

Health (acute effects) = 1

Flammability = 3

Reactivity = 1

4 First aid measures**After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

(Contd. on page 2)

USA

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

Product name: n-Butyl acetate

(Contd. of page 1)

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

5 Fire fighting measures**Suitable extinguishing agents**

Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.

Special hazards caused by the material, its products of combustion or resulting gases:

In case of fire, the following can be released:

Carbon monoxide and carbon dioxide

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures**Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Keep away from ignition sources.

Additional information:

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage**Handling****Information for safe handling:**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires:

Keep ignition sources away.

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

Storage**Requirements to be met by storerooms and receptacles:**

No special requirements.

Information about storage in one common storage facility:

Store away from oxidizing agents.

Further information about storage conditions:

Keep container tightly sealed.

(Contd. on page 3)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

Product name: n-Butyl acetate

(Contd. of page 2)

Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

n-Butyl acetate

	ppm
ACGIH TLV	150; 200-STEL
Austria TWA	200
Belgium TWA	150; 200-STEL
Denmark TWA	150
Finland TWA	150; 200-STEL
France TWA	150; 200-STEL
Germany TWA	100
Hungary TWA	200; 600-STEL
Ireland TWA	150; 200-STEL
Netherlands TWA	150
Poland TWA	200
Russia TWA	200; 200-STEL
Sweden TWA	100; 150-STEL
Switzerland TWA	150; 300-STEL
United Kingdom TWA	150; 200-STEL
USA PEL	150

Additional information: No data**Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Breathing equipment:

Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties:**General Information**

Form:	Liquid
Color:	Colorless
Odor:	Fruit-like

(Contd. on page 4)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

Product name: n-Butyl acetate

(Contd. of page 3)

Change in condition**Melting point/Melting range:** -73.5°C (-100°F)**Boiling point/Boiling range:** 126.5°C (260°F)**Sublimation temperature / start:** Not determined**Flash point:** 22°C (72°F)**Ignition temperature:** 421°C (790°F)**Decomposition temperature:** Not determined**Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures is possible.**Explosion limits:****Lower:** 1.4 Vol %**Upper:** 7.6 Vol %**Vapor pressure at 20°C (68°F):** 11 hPa (8 mm Hg)**Density at 20°C (68°F):** 0.882 g/cm³**10 Stability and reactivity****Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

Materials to be avoided: Oxidizing agents**Dangerous reactions** No dangerous reactions known**Dangerous products of decomposition:** Carbon monoxide and carbon dioxide**11 Toxicological information****Acute toxicity:****LD/LC50 values that are relevant for classification:**

Oral	LD50	4700 mg/kg (gpg)
		4300 mg/kg (mam)
		6000 mg/kg (mus)
		10768 mg/kg (rat)
		3200 mg/kg (rbt)
Dermal	LD50	>17600 mg/kg (rbt)
Inhalative	LC50/2H	6000 mg/m ³ /2H (mus)
	LC50/4H	390 ppm/4H (rat)
Irritation of skin	moderate	500 mg/24H (rbt)

Primary irritant effect:**on the skin:** Irritant to skin and mucous membranes.**on the eye:** Irritating effect.**Sensitization:** No sensitizing effects known.**Other information (about experimental toxicology):**

Reproductive effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:**Subacute to chronic toxicity:**

The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:

(Contd. on page 5)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

Product name: n-Butyl acetate

(Contd. of page 4)

Sense Organs and Special Senses (Olfaction) - effect, not otherwise specified.

Sense Organs and Special Senses (Eye) - effect, not otherwise specified.

Sense Organs and Special Senses (Eye) - conjunctive irritation.

Lungs, Thorax, or Respiration - other changes.

Lungs, Thorax, or Respiration - acute pulmonary edema.

Lungs, Thorax, or Respiration - emphysema.

Blood - hemorrhage.

Blood - changes in erythrocyte (RBC) count.

Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).

Behavioral - somnolence (general depressed activity).

Behavioral - antipsychotic.

Behavioral - changes in motor activity (specific assay).

Behavioral - general anesthetic.

Behavioral - muscle weakness.

Nutritional and Gross Metabolic - weight loss or decreased weight gain.

Nutritional and Gross Metabolic - changes in sodium.

Nutritional and Gross Metabolic - changes in chlorine.

Related to Chronic Data - changes in testicular weight.

Endocrine - changes in adrenal weight.

Endocrine - changes in spleen weight.

Brain and Coverings - changes in brain weight.

Gastrointestinal - changes in structure or function of salivary glands.

Liver - other changes.

Liver - fatty liver degeneration.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other transferases.

Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases.

Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).

Reproductive - Specific Developmental Abnormalities - musculoskeletal system.

Subacute to chronic toxicity:

Inhalation of n-butyl acetate causes conjunctiva irritation and unspecified nasal and respiratory system effects. High concentrations may cause narcosis. Teratogenic effects in laboratory animals have been reported. May cause liver damage.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Carcinogen as defined by OSHA.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:**General notes:**

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Do not allow material to be released to the environment without proper governmental permits.

USA

(Contd. on page 6)

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

Product name: n-Butyl acetate

(Contd. of page 5)

13 Disposal considerations**Product:****Recommendation**

Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:**Recommendation:** Disposal must be made according to official regulations.**14 Transport information****DOT regulations:**

Hazard class: 3
Identification number: UN1123
Packing group: III
Proper shipping name (technical name): BUTYL ACETATES
Label 3

Land transport ADR/RID (cross-border)

ADR/RID class: 3 (F1) Flammable liquids
Danger code (Kemler): 30
UN-Number: 1123
Packaging group: III
Description of goods: 1123 BUTYL ACETATES

Maritime transport IMDG:

IMDG Class: 3
UN Number: 1123
Label 3
Packaging group: III
Proper shipping name: BUTYL ACETATES

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class: 3
UN/ID Number: 1123
Label 3
Packaging group: III

(Contd. on page 7)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/29/2006

Reviewed on 08/14/2006

Product name: n-Butyl acetate

(Contd. of page 6)

Proper shipping name:

BUTYL ACETATES

15 Regulations**Product related hazard informations:****Risk phrases:**

10 Flammable.

66 Repeated exposure may cause skin dryness or cracking

67 Vapours may cause drowsiness and dizziness

Safety phrases:

25 Avoid contact with eyes.

60 This material and its container must be disposed of as hazardous waste.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:

For use only by technically qualified individuals.

This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.**Contact:** Darrell R. Sanders

USA



An ISO 9001:2000
Certified Company

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300
or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: N Butyl alcohol
This MSDS is valid for all grades that start with catalog number 331

General Information

Company's Name: PHARMCO PRODUCTS, INC.	Safety Data Review Date: 8/23/99
Company's Street: 58 VALE RD.	Preparer's Company: PHARMCO PRODUCTS, INC.
Company's City: BROOKFIELD	Preparer's St Or P. O. Box: 58 VALE RD.
Company's State: CT	Preparer's City: BROOKFIELD
Company's Zip Code: 06804	Preparer's State: CT
Company's Emerg Ph #: (203) 740-3471	Preparer's Zip Code: 06804
Company's Info Ph #: (203) 740-3471	
Date MSDS Revised: Nishant-8/23/99	

Ingredients/Identity Information

Ingredient: BUTANOL, N-BUTYL ALCOHOL, PROPYL CARBINOL, BUTYL ALCOHOL
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: EO1400000
CAS Number: 71-36-3
OSHA PEL: 100 PPM
ACGIH TLV: C 152 MG/CUM
Other Recommended Limit: 300 MG/CUM

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID W/A SHARP ALCOHOLIC ODOR
Boiling Point: 243.5F
Melting Point: -130F
Vapor Pressure (MM Hg/70 F): 4.4
Vapor Density (Air=1): 2.55
Specific Gravity: 0.807
Evaporation Rate And Ref: (BU AC=1): 0.5
Solubility In Water: 7.8%
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: 84.2F
Flash Point Method: TCC
Lower Explosive Limit: 1.4
Upper Explosive Limit: 11.2
Extinguishing Media: CO2, DRY CHEMICAL/ALCOHOL FOAM
Special Fire Fighting Proc: WEAR FULL PROTECTIVE CLOTHING & SELF CONTAINED

BREATHING APPARATUS. KEEP FIRE EXPOSED CONTAINERS COOL W/WATER SPRAY.
Unusual Fire And Expl Hazrds: FLAMMABLE. HEAT WILL BUILD PRESSURE & MAY
RUPTURE CLOSED STORAGE CONTAINERS. AUTO-IGNITION TEMP: 649.4F.

=====

Reactivity Data

=====

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS, OPEN FLAME, OPEN CONTAINERS, POOR
VENTILATION & DIRECT SUNLIGHT.
Materials To Avoid: STRONG OXIDIZING AGENTS, STRONG ACIDS & BASES.
Hazardous Decomp Products: CO & OTHER TOXIC VAPORS.
Hazardous Poly Occur: NO

=====

Health Hazard Data

=====

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION: IRRITATION TO THE MUCOUS
MEMBRANES. EYES: IRRITATION. SKIN: IRRITATION/DERMATITIS/TOXIC EFFECTS
THROUGH ABSORPTION. INGESTION: GASTROINTESTINAL TRACT IRRITATION. PRODUCT
IS A MUCOUS MEMBRANE IRRITANT & CNS DEPRESSANT.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, LACHRYMATION, PHOTOPHOBIA,
HEADACHE, DIZZINESS, NAUSEA, INCOORDINATION, DROWSINESS, BLURRING OF
VISION, DEFATTING, GI DISCOMFORT.
Med Cond Aggravated By Exp: INDIVIDUALS SUSCEPTIBLE TO DERMATITIS.
SIMULTANEOUS EXPOSURE TO N-BUTYL ALCOHOL & ETHYL ALCOHOL CAN INCREASE THE
TOXIC HAZARDS OF N-BUTYL ALCOHOL.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. ADMINISTER CPR
FLUSH THOROUGHLY FOR 15 MINS. WASH W/SOAP & WATER. INGESTION: ASPIRATION
HAZARD-DON'T INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IN ALL CASES.

=====

Precautions for Safe Handling and Use

=====

Steps If Matl Released/Spill: PROTECT FROM IGNITION. WEAR PROTECTIVE
CLOTHING & USE APPROVED RESPIRATOR EQUIPMENT. ABSORB MATERIAL IN AN
ABSORBENT RECOMMENDED FOR SOLVENT SPILLS & REMOVE TO A SAFE LOCATION FOR
DISPOSAL BY APPROVED METHODS.
Waste Disposal Method: DISPOSE OF AS AN EPA HAZARDOUS WASTE IN ACCORDANCE
W/LOCAL, STATE & FEDERAL REGULATIONS. FLAMMABLE LIQUID NA1120. HAZARDOUS
WASTE NO: U031 (IGNITABLE); D001 (IGNITABLE).
Precautions-Handling/Storing: PROTECT FROM EXTREME TEMPS & DIRECT
SUNLIGHT. STORE IN AN ACCEPTABLY PROTECTED & SECURE FLAMMABLE LIQUID
STORAGE ROOM.
Other Precautions: GROUND & BOND METAL CONTAINERS TO MINIMIZE STATIC
SPARKS.

=====

Control Measures

=====

Respiratory Protection: USE APPROVED RESPIRATOR EQUIPMENT (AIR-PURIFYING,
AIR-SUPPLIED/SELF CONTAINED BREATHING APPARATUS).
Ventilation: LOCAL/GENERAL DEPENDING ON THE CONDITIONS OF USE, QUANTITY OF
MATERIAL & OTHER OPERATING PARAMETERS.
Protective Gloves: NEOPRENE/RUBBER/NITRILE RUBBER

Eye Protection: SAFETY GLASSES, GOGGLES/FACE SHIELD.
Other Protective Equipment: CHEMICAL RESISTANT CLOTHING, EYE WASH
FOUNTAINS & SAFETY SHOWERS
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE
REUSE. REMOVE/DISCARD CONTAMINATED SHOES.

=====

Transportation Data

=====

DOT: Butanol, 3, UN1120, PG III

=====

Disposal Data

=====

Refer to applicable regional, state and federal codes.

=====

Label Data

=====

Common Name: N-BUTYL ALCOHOL
Special Hazard Precautions: INHALATION: IRRITATION TO THE MUCOUS
MEMBRANES. EYES: IRRITATION. SKIN: IRRITATION/DERMATITIS/TOXIC EFFECTS
THROUGH ABSORPTION. INGESTION: GASTROINTESTINAL TRACT IRRITATION. PRODUCT
IS A MUCOUS MEMBRANE IRRITANT & CNS DEPRESSANT. IRRITATION, LACHRYMATION,
PHOTOPHOBIA, HEADACHE, DIZZINESS, NAUSEA, INCOORDINATION, DROWSINESS,
BLURRING OF VISION, DEFATTING, GI DISCOMFORT.

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product.

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HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CALCIUM BROMIDE**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CALCIUM BROMIDE
Synonyms: None
Chemical Family: Inorganic Salt
Application: Additive
Manufacturer/Supplier: Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000
Prepared By: Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium bromide	7789-41-5	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and laundry before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Wash hands after use.

Storage Information Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls A well ventilated area to control dust levels.

Respiratory Protection Dust/mist respirator. (95%)

Hand Protection Impervious rubber gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	3.35
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (F):	1490
Boiling Point/Range (C):	810
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	15
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Contact with water. Potassium.
Hazardous Decomposition Products	Hydrogen bromide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation.
Eye Contact	May cause severe eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	Repeated excessive ingestion may cause central nervous system effects.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	LD50: 4000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined

Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Ames Test: Negative

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS

Not applicable

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

Tideport

1049

MSDS 242-7

TEXAS AROMATICS, LP
MATERIAL SAFETY DATA SHEET
C12 DISTILLATE BLENDSTOCK
SEPTEMBER 14, 2007

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: C12 DISTILLATE BLENDSTOCK

CHEMICAL NAME:

Alkenes, C11-13, C12 Rich

CAS# 68526-58-9

CHEMICAL FAMILY:

Higher Olefins, Dodecene. Petroleum hydrocarbon

PRODUCT DESCRIPTION:

Liquid with characteristic odor containing
predominantly C12 olefin isomers.

Emergency Phone Number:

Texas Aromatics, LP
3555 Timmons Lane, Suite 700
Houston, TX 77027

CHEMTREC (800) 424-9300

(713)520-2900

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

The composition of this mixture may be proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse.

This product is hazardous as defined in 29 CFR1910.1200, based on the following compositional information:

OSHA HAZARD	COMPONENT
Combustible	

SECTION 3 HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

EYE CONTACT:

Slightly irritating but does not injure eye tissue.

SKIN CONTACT:

Occasional brief contact with the liquid will not result in significant irritation unless evaporation is impeded.

Frequent or prolonged contact may irritate.

Low order of toxicity.

INHALATION:

Low order of toxicity.

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects.

INGESTION:

Small amounts of the liquid aspirated into the respiratory system during ingestion, or from vomiting, may cause bronchiopneumonia or pulmonary edema.

Minimal toxicity.

SECTION 4 FIRST AID MEASURES**EYE CONTACT:**

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water; use soap if available.

INHALATION:

Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

SECTION 5 FIRE-FIGHTING MEASURES

FLASH POINT: 39 Deg C. METHOD: ASTM D-93, PMCC, Procedure A
FLAMMABLE LIMITS: NOTE: Not Available
AUTOIGNITION TEMP.: NOTE: Not Available

GENERAL HAZARD

Combustible Liquid, can form combustible mixtures at temperatures at or above the flashpoint.
Static Discharge, material can accumulate static charges which can cause an incendiary electrical discharge .
"Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.

FIRE FIGHTING

Use water spray to cool fire exposed surfaces and to protect personnel. Isolate "fuel" supply from fire.
Use foam, dry chemical, or water spray to extinguish fire.
Avoid spraying water directly into storage containers due to danger of boilover.

DECOMPOSITION PRODUCTS UNDER FIRE CONDITIONS

No unusual

SECTION 6 ACCIDENTAL RELEASE MEASURES

LAND SPILL

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is subject to CERCLA reporting (see Section 15 REGULATORY INFORMATION) notify the National Response Center.
Prevent liquid from entering sewers, watercourses, or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust.

Recover by pumping (use an explosion proof or hand pump) or with a suitable absorbent.
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL

Eliminate sources of ignition. Warn occupants and shipping in surrounding and downwind areas of fire and explosion hazard and request all to stay clear.
Remove from surface with suitable adsorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in non-confined waters.
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 7 STORAGE AND HANDLING

ELECTROSTATIC ACCUMULATION HAZARD

Yes, use proper bonding and/or grounding procedure.
Additional information regarding safe handling of products with static accumulation potential can be ordered by contacting the American Petroleum Institute (API) for API Recommended Practice 2003, entitled "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents" (American Petroleum Institute, 1220 L Street Northwest, Washington, DC 20005), or the National Fire Protection Association (NFPA) for NFPA 77 entitled "Static Electricity" (National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101).

STORAGE TEMPERATURE Deg F:

Ambient

LOADING/UNLOADING TEMPERATURE Deg F:

Ambient

STORAGE/TRANSPORT PRESSURE mmHg:

Atmospheric

LOADING/UNLOADING VISCOSITY cSt:

1.9

STORAGE AND HANDLING:

Keep container closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials.
Do NOT handle or store near an open flame, heat or other sources of ignition. Protect material from direct sunlight.
Material will accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or grounding procedures.

Do NOT pressurize, cut, heat, or weld containers. Empty product containers may contain product residue. Do NOT reuse empty containers without commercial cleaning or reconditioning.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE CONTROLS

The use of mechanical dilution ventilation is recommended whenever this product is used in a confined space, is heated above ambient temperatures, or is agitated.

PERSONAL PROTECTION

For open systems where contact is likely, wear safety glasses with side shields, long sleeves, and chemical resistant gloves. Where contact may occur, wear safety glasses with side shields. Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

SPECIFIC GRAVITY at Deg F:	0.77 at 68
VAPOR PRESSURE, mmHg at Deg F:	< 51.68 at 100
SOLUBILITY IN WATER, wt. % at Deg F:	Insoluble
VISCOSITY OF LIQUID, cSt at Deg F:	1.9 at 68
SP. GRAV. OF VAPOR, at 1 atm (Air=1):	5.81
FREEZING/MELTING POINT, Deg F:	-148
EVAPORATION RATE, n-Bu Acetate=1:	Less Than 0.1
BOILING POINT, Deg F:	356 to 424

SECTION 10 STABILITY AND REACTIVITY

STABILITY:

Stable

HAZARDOUS POLYMERIZATION:

Will not occur

CONDITIONS TO AVOID HAZARDOUS POLYMERIZATION:

Not Applicable

MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY:

Strong oxidizing agents, inorganic acids, haloenated compounds, halogens, molten sulfur.

HAZARDOUS DECOMPOSITION PRODUCTS:

None

SECTION 11 TOXICOLOGICAL INFORMATION

Please refer to Section 3 for available information on potential health effects.

SECTION 12 ECOLOGICAL INFORMATION

No specific ecological data are available for this product. Please refer to Section 6 for information regarding accidental releases and Section 15 for regulatory reporting information.

SECTION 13 DISPOSAL CONSIDERATIONS

Please refer to Sections 5, 6 and 15 for disposal and regulatory information.

SECTION 14 TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT SHIPPING DESCRIPTION: Combustible liquid, N.O.S., (C12 olefins), Combustible liquid, NA 1993, PG III.
International shipping: Flammable liquid, N.O.S., (C12 olefins), 3, NA 1993, PG III (for all sizes of containers).

SECTION 15 REGULATORY INFORMATION

TSCA:

This product is listed on the TSCA Inventory as a UVCB (Unknown, Variable Composition or Biological) Chemical at CAS Registry Number 68526-58-9

CERCLA:

If this product is accidentally spilled, it is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act. We recommend you contact local authorities to determine if there may be other local reporting requirements.

SARA TITLE III:

Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:

Fire.

This information may be subject to the provisions of the Community Right-to-Know Reporting Requirements (40 CFR 370) if threshold quantity criteria are met.

This product does not contain Section 313 Reportable Ingredients.

SECTION 16 OTHER INFORMATION

NOTES:

1. Air exposure must be minimized to limit build up of peroxides which will concentrate in bottoms if product is distilled.

Product must not be distilled to dryness if peroxide concentration is substantially above 10 ppm as active oxygen since explosive decomposition may occur. Distillate must be immediately inhibited in line from condenser to minimize peroxide formation.

If product is to be distilled washing with aqueous ferrous ammonium sulphate will destroy peroxides but the product must be immediately re-inhibited.

INTERNATIONAL PACKAGE CLASSIFICATION: Flammable liquid, N.O.S., (C12

olefins), 3, NA 1993, PG III (for all sizes of containers).

HAZARD RATING SYSTEMS:

This information is for people trained in:
National Paint & Coatings Association's (NPCA)
Hazardous Materials Identification System (HMIS)
National Fire Protection Association (NFPA 704)
Identification of the Fire Hazards of Materials

	NPCA-HMIS	NFPA 704	KEY
HEALTH	2	1	4 = Severe
FLAMMABILITY	2	2	3 = Serious
REACTIVITY	1	1	2 = Moderate
			1 = Slight
			0 = Minimal

CAUTION: HMIS ratings are based on a 0-4 rating scale with 1 representing minimal hazards or risks, and 4 representing significant hazards or risks. Recommended HMIS ratings should not be used in the absence of a fully implemented HMIS hazard communication program.

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

This information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

Material Safety Data Sheet

Calcium chloride

ACC# 03900

Section 1 - Chemical Product and Company Identification

MSDS Name: Calcium chloride

Catalog Numbers: AC219170000, AC219170010, AC219170025, AC219170250, AC219175000, AC297150000, AC297150250, AC297155000, AC300380000, AC300380010, AC300380025, AC300382500, AC349610000, AC349610250, AC349615000, S71923, S71924, S73000, S73046, S799422, S93162, C614-10, C614-3, C614-500, C77-212, C77-500, NC9297837, NC9830185

Synonyms: Calpus; Caltac; Dowflake; Liquidow; Peladow; Snowmelt; Superflake anhydrous.

Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10043-52-4	Calcium chloride	>96	233-140-8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.

Warning! May be harmful if swallowed. May cause severe respiratory and digestive tract irritation with possible burns. May cause severe eye and skin irritation with possible burns. May cause cardiac disturbances. Hygroscopic (absorbs moisture from the air).

Target Organs: Eyes.

Potential Health Effects

Eye: Contact with eyes may cause severe irritation, and possible eye burns.

Skin: Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.

Ingestion: May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. May cause cardiac disturbances. May be harmful if swallowed. In very severe cases, seizures, rapid respiration, slow heartbeat, or death, may

Inhalation: May cause severe irritation of the upper respiratory tract with pain, burns, and inflammation.

Chronic: Effects may be delayed.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.

Flash Point: Not applicable.

Autoignition Temperature: Not applicable.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section.

Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Wash clothing before reuse. Always use cool water when dissolving calcium chloride. Heat evolved is significant.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Calcium chloride	none listed	none listed	none listed

OSHA Vacated PELs: Calcium chloride: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear impervious gloves.

Clothing: Wear appropriate protective clothing to minimize contact with skin.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: white

Odor: odorless

pH: Not available.

Vapor Pressure: Not available.

por Density: Not available.

aporation Rate:Not available.

Viscosity: Not available.

Boiling Point: 1600 deg C @ 760 mmHg

Freezing/Melting Point:782 deg C

Decomposition Temperature:Not available.

Solubility: Soluble.

Specific Gravity/Density:2.1500 g/cm3

Molecular Formula:CaCl2

Molecular Weight:110.99

Section 10 - Stability and Reactivity

Chemical Stability: Stable.

Conditions to Avoid: Dust generation, excess heat, exposure to moist air or water.

Incompatibilities with Other Materials: Bromine trifluoride, Furan-2-peroxycarboxylic acid, Solutions attack some metals..

Hazardous Decomposition Products: Hydrogen chloride, calcium oxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 10043-52-4: EV9800000

LD50/LC50:

CAS# 10043-52-4:

Oral, mouse: LD50 = 1940 mg/kg;

Oral, rabbit: LD50 = 1384 mg/kg;

Oral, rat: LD50 = 1 gm/kg;

Carcinogenicity:

CAS# 10043-52-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found

Teratogenicity: No information found

Reproductive Effects: No information found

Mutagenicity: Mutagenic effects have occurred in experimental animals.

eurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not Regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 10043-52-4 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

RA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SAHA Codes

CAS # 10043-52-4: immediate, delayed, reactive.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10043-52-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36 Irritating to eyes.

Safety Phrases:

S 22 Do not breathe dust.

S 24 Avoid contact with skin.

WGK (Water Danger/Protection)

CAS# 10043-52-4: 0

Canada - DSL/NDSL

CAS# 10043-52-4 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MS Creation Date: 12/12/1997

Revision #7 Date: 6/06/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

1 Identification of substance:**Product details:****Product name:** Calcium hydroxide**Stock number:** 14662**Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company
 Johnson Matthey Catalog Company, Inc.
 30 Bond Street
 Ward Hill, MA 01835-8099
 Emergency Phone: (978) 521-6300
 CHEMTREC: (800) 424-9300
 Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department**Emergency information:**

During normal hours the Health, Safety and Environmental Department.
 After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:**Chemical characterization:****Description:** (CAS#)

Calcium hydroxide (CAS# 1305-62-0): 100%

Identification number(s):**EINECS Number:** 215-137-3**3 Hazards identification****Hazard description:**

C Corrosive

Information pertaining to particular dangers for man and environment

R 34 Causes burns.

Classification system**HMIS ratings (scale 0-4)****(Hazardous Materials Identification System)**

HEALTH	2
FIRE	0
REACTIVITY	1

Health (acute effects) = 2

Flammability = 0

Reactivity = 1

4 First aid measures**General information**

Immediately remove any clothing soiled by the product.

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

(Contd. on page 2)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Calcium hydroxide

(Contd. of page 1)

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.**5 Fire fighting measures****Suitable extinguishing agents**

CO2, sand, extinguishing powder. Do not use water.

For safety reasons unsuitable extinguishing agents Water**Special hazards caused by the material, its products of combustion or resulting gases:**

In case of fire, the following can be released:

Metal oxide fume

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures**Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Additional information:

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage**Handling****Information for safe handling:**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires:

The product is not flammable

Storage**Requirements to be met by storerooms and receptacles:**

No special requirements.

Information about storage in one common storage facility:

Do not store together with acids..

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

USA

(Contd. on page 3)

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Calcium hydroxide

(Contd. of page 2)

8 Exposure controls and personal protection**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Calcium hydroxide

	mg/m3
ACGIH TLV	5
Austria MAK	5
Belgium TWA	5
Denmark TWA	5
Finland TWA	5
France VME	5
Korea TLV	5
Norway TWA	5
Poland TWA	2
Switzerland MAK-W	5
United Kingdom	5-LTEL
USA PEL	5 (respirable fraction)
	15 (total dust)

Additional information: No data**Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Breathing equipment:

Use suitable respirator when high concentrations are present.

Protection of hands:

Check protective gloves prior to each use for their proper condition.

Impervious gloves

Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection:

Safety glasses

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties:**General Information**

Form:	Powder
Color:	White
Odor:	Odorless

Change in condition

Melting point/Melting range:	580°C (1076°F)
Boiling point/Boiling range:	Not determined

(Contd. on page 4)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Calcium hydroxide

(Contd. of page 3)

Sublimation temperature / start: Not determined	
Flash point:	Not applicable
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined
Upper:	Not determined
Vapor pressure:	Not determined
Density at 20°C (68°F):	2.24 g/cm ³

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:

Decomposition will not occur if used and stored according to specifications.

Materials to be avoided: Acids

Dangerous reactions No dangerous reactions known

Dangerous products of decomposition: Metal oxide fume

11 Toxicological information

Acute toxicity:

LD/LC50 values that are relevant for classification:

Oral	LD50	7300 mg/kg (mus)
		7340 mg/kg (rat)
Irritation of eyes	severe	10 mg (rbt)

Primary irritant effect:

on the skin:

Corrosive effect on skin and mucous membranes.

Irritant to skin and mucous membranes.

on the eye:

Strong corrosive effect.

Irritating effect.

Sensitization: No sensitizing effects known.

Other information (about experimental toxicology):

Mutagenic effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:

Corrosive materials are acutely destructive to the respiratory tract, eyes, skin and digestive tract. Eye contact may result in permanent damage and complete vision loss. Inhalation may result in respiratory effects such as inflammation, edema, and chemical pneumonitis. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Ingestion may cause damage to the mouth, throat and esophagus.

May cause skin burns or irritation depending on the severity of the exposure.

(Contd. on page 5)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Calcium hydroxide

(Contd. of page 4)

Additional toxicological information:

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:**General notes:**

Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations**Product:****Recommendation**

Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

14 Transport information**DOT regulations:**

Hazard class:	8
Identification number:	UN3262
Packing group:	III
Proper shipping name (technical name):	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S. (calcium hydroxide)
Label	8

Land transport ADR/RID (cross-border)

ADR/RID class:	8 (C6) Corrosive substances
Danger code (Kemler):	80
UN-Number:	3262
Packaging group:	III
Description of goods:	3262 CORROSIVE SOLID, BASIC, INORGANIC, N.O.S. (calcium hydroxide)

(Contd. on page 6)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Calcium hydroxide

(Contd. of page 5)

Maritime transport IMDG:

IMDG Class: 8
UN Number: 3262
Label 8
Packaging group: III
Proper shipping name: CORROSIVE SOLID, BASIC, INORGANIC,
 N.O.S. (calcium hydroxide)

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class: 8
UN/ID Number: 3262
Label 8
Packaging group: III
Proper shipping name: CORROSIVE SOLID, BASIC, INORGANIC,
 N.O.S. (calcium hydroxide)

15 Regulations**Product related hazard informations:****Hazard symbols:**

C Corrosive

Risk phrases:

34 Causes burns.

Safety phrases:

- 20 When using do not eat or drink.
- 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
- 45 In case of accident or if you feel unwell, seek medical advice immediately.
- 60 This material and its container must be disposed of as hazardous waste.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:

For use only by technically qualified individuals.

USA

(Contd. on page 7)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 08/28/2006

Reviewed on 08/25/2006

Product name: Calcium hydroxide

(Contd. of page 6)

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Darrell R. Sanders

— USA —

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 03/26/2007

Reviewed on 01/26/2007

1 Identification of substance:**Product details:****Product name:** Calcium stearate**Stock number:** 39423**Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company
 Johnson Matthey Catalog Company, Inc.
 30 Bond Street
 Ward Hill, MA 01835-8099
 Emergency Phone: (978) 521-6300
 CHEMTREC: (800) 424-9300
 Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department**Emergency information:**

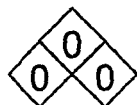
During normal hours the Health, Safety and Environmental Department.
 After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:**Chemical characterization:****Description:** (CAS#)

calcium stearate (CAS# 1592-23-0); 100%

Identification number(s):**EINECS Number:** 216-472-8**3 Hazards identification****Hazard description:** Not applicable**Information pertaining to particular dangers for man and environment**

Not applicable

Classification system**NEPA Ratings (scale 0-4)**

Health = 0

Fire = 0

Reactivity = 0

HMIS ratings (scale 0-4)**(Hazardous Materials Identification System)**

HEALTH	1
FIRE	1
REACTIVITY	1

Health (acute effects) = 1

Flammability = 1

Reactivity = 1

4 First aid measures**After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

(Contd. on page 2)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 03/26/2007

Reviewed on 01/26/2007

Product name: Calcium stearate

(Contd. of page 1)

After swallowing Seek medical treatment.

5 Fire fighting measures**Suitable extinguishing agents**

Product is not flammable. Use fire fighting measures that suit the surrounding fire.

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures**Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting: Pick up mechanically.

Additional information:

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage**Handling****Information for safe handling:**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

No special precautions are necessary if used correctly.

Information about protection against explosions and fires:

No special measures required.

Storage**Requirements to be met by storerooms and receptacles:**

No special requirements.

Information about storage in one common storage facility:

Store away from oxidizing agents.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Stearates

mg/m³

ACGIH TLV

10

Ireland TWA

10

Netherlands TWA

10

(Contd. on page 3)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 03/26/2007

Reviewed on 01/26/2007

Product name: Calcium stearate

(Contd. of page 2)

Additional information: No data

Personal protective equipment**General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Breathing equipment:

Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties:**General Information**

Form:	Powder
Color:	White
Odor:	Odorless

Change in condition

Melting point/Melting range:	179-180°C (354-356°F)
-------------------------------------	-----------------------

Boiling point/Boiling range:	Not determined
-------------------------------------	----------------

Sublimation temperature / start:	Not determined
---	----------------

Flash point:	Not applicable
---------------------	----------------

Flammability (solid, gaseous)	Product is not flammable.
--------------------------------------	---------------------------

Ignition temperature:	Not determined
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Decomposition temperature:	Not determined
-----------------------------------	----------------

Danger of explosion:	Product does not present an explosion hazard.
-----------------------------	---

Explosion limits:

Lower:	Not determined
---------------	----------------

Upper:	Not determined
---------------	----------------

Vapor pressure:	Not determined
------------------------	----------------

Density:	Not determined
-----------------	----------------

Solubility in / Miscibility with

Water:	Insoluble
---------------	-----------

10 Stability and reactivity**Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

Materials to be avoided: Oxidizing agents

Dangerous reactions Reacts with oxidizing agents

Dangerous products of decomposition: Carbon monoxide and carbon dioxide

USA

(Contd. on page 4)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 03/26/2007

Reviewed on 01/26/2007

Product name: Calcium stearate

(Contd. of page 3)

11 Toxicological information**Acute toxicity:****LD/LC50 values that are relevant for classification:**

Oral	LD50	>10000 mg/kg (mus) >10000 mg/kg (rat)
Inhalative	LC50/4H	>1241 mg/m3/4H (mam)

Primary irritant effect:

on the skin: May cause irritation

on the eye: Powder: irritant effect

Sensitization: No sensitizing effects known.**Subacute to chronic toxicity:**

The toxicity of calcium compounds is generally due to the anion.

Toxicity, as indicated by the LC50 and LD50 data is low. Product may have irritating effects at lower exposure levels.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

12 Ecological information:**General notes:**

Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations**Product:****Recommendation**

Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:**Recommendation:** Disposal must be made according to official regulations.**14 Transport information**

Not a hazardous material for transportation.

DOT regulations:**Hazard class:** None**Land transport ADR/RID (cross-border)****ADR/RID class:** None**Maritime transport IMDG:****IMDG Class:** None**Air transport ICAO-TI and IATA-DGR:****ICAO/IATA Class:** None**Transport/Additional information:**

Not dangerous according to the above specifications.

USA

(Contd. on page 5)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 03/26/2007

Reviewed on 01/26/2007

Product name: Calcium stearate

(Contd. of page 4)

15 Regulations**Product related hazard informations:**

Observe the general safety regulations when handling chemicals

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:

For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Darrell R. Sanders

— USA —

MATERIAL SAFETY DATA SHEET



Bayer MaterialScience

Bayer MaterialScience LLC
Product Safety & Regulatory Affairs
100 Bayer Road
Pittsburgh, PA 15205-9741
USA

TRANSPORTATION EMERGENCY
CALL CHEMTREC: (800) 424-9300
INTERNATIONAL: (703) 527-3887

NON-TRANSPORTATION
Bayer Emergency Phone: (412) 923-1800
Bayer Information Phone: (800) 662-2927

1. Product and Company Identification

Product Name: CARADOL SC 56-20
Material Number: 3606612
Chemical Family: Polyether Polyol
Chemical Name: Poly (Oxyalkylene) Polymer

2. Hazards Identification

Emergency Overview

Color: Clear **Form:** liquid viscous **Odor:** Mild.
Product poses little or no hazard if spilled. Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Irritating gases/fumes may be given off during burning or thermal decomposition.

Potential Health Effects

Primary Routes of Entry: Skin Contact, Eye Contact

Medical Conditions Aggravated by Exposure: None known.

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

General Effects of Exposure

Acute Effects of Exposure

For Product: CARADOL SC 56-20

Not expected to cause any adverse acute health effects.

Chronic Effects of Exposure

For Product: CARADOL SC 56-20

Not expected to cause any adverse chronic health effects.

Carcinogenicity:

No Carcinogenic substances as defined by IARC, NTP and/or OSHA

Material Name: CARADOL SC 56-20

Article Number: 3606612

Page: 1 of 6 Report Version: 1.8

EPAPA005000723

3. Composition/Information on Ingredients

Hazardous Components

This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

4. First Aid Measures

Eye Contact

In case of contact, flush eyes with plenty of lukewarm water. Get medical attention if irritation develops.

Skin Contact

In case of skin contact, wash affected areas with soap and water. Thoroughly clean shoes before reuse. Wash clothing before reuse. Get medical attention if irritation develops and persists.

Inhalation

If inhaled, remove to fresh air. If breathing is difficult, give oxygen. Get medical attention if irritation develops.

Ingestion

If ingested, do not induce vomiting unless directed to do so by medical personnel. Get medical attention.

5. Fire-Fighting Measures

Suitable Extinguishing Media: carbon dioxide (CO₂), dry chemical, foam, water spray for large fires.

Special Fire Fighting Procedures

Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes. Use cold water spray to cool fire-exposed containers to minimize risk of rupture. Toxic and irritating gases/fumes may be given off during burning or thermal decomposition.

6. Accidental release measures

Spill and Leak Procedures

Dike or dam spilled material and control further spillage, if possible. Cover spill with inert material (e. g., dry sand or earth) and collect for proper disposal. Collect and place in appropriately marked sealable containers for disposal. Wash spill area with soap and water.

7. Handling and Storage

Storage Temperature:

minimum:	20 °C (68 °F)
maximum:	60 °C (140 °F)

Material Name: CARADOL SC 56-20

Article Number: 3606612

Storage Period
36 Months

Handling/Storage Precautions

Handle in accordance with good industrial hygiene and safety practices. Wash thoroughly after handling. Keep container closed when not in use. Material is hygroscopic and may absorb small amounts of atmospheric moisture. If contamination with isocyanates is suspected, do not resal containers. Avoid inhalation of vapour or mist.

8. Exposure Controls / Personal Protection

Country specific exposure limits have not been established or are not applicable

Industrial Hygiene/Ventilation Measures

Under normal conditions of use, special ventilation is not required.

Respiratory Protection

None required under normal conditions of use., NIOSH approved air-supplied respirator during die cleaning, high temperature processing or when thermal decomposition is suspected.

Hand Protection

Permeation resistant gloves., Butyl rubber gloves., Nitrile rubber gloves., Neoprene gloves

Eye Protection

safety glasses with side-shields.

Skin and body protection

No special skin protection requirements during normal handling and use.

Additional Protective Measures

Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees in the safe use and handling of this product.

9. Physical and chemical properties

Form:	liquid
Appearance:	viscous
Color:	Clear
Odor:	Mild
pH:	Approximately 7
Freezing Point:	< -8.89 °C (< 16 °F)
Boiling Point/Range:	No Data Available
Flash Point:	> 93.33 °C (> 200 °F)
Vapor Pressure:	< 0.001 mmHg @ 25 °C (77 °F)
Specific Gravity:	Approximately 1.01 - 1.05
Solubility in Water:	Slightly Soluble
Viscosity, Dynamic:	Approximately 540 - 1,233 cP @ 20 °C (68 °F)
Bulk Density:	8.428 - 8.762 lb/gal
Molecular Weight:	2,000
Hygroscopicity:	hygroscopic

Material Name: CARADOL SC 56-20

Article Number: 3606612

Page: 3 of 6 Report Version: 1.8

EPAPA005000725

10. Stability and Reactivity

Hazardous Reactions

Hazardous polymerization does not occur.

Stability

Stable

Materials to avoid

oxidizing agents, Isocyanates

Hazardous decomposition products

By Fire and Thermal Decomposition: Carbon dioxide (CO₂), carbon monoxide (CO), oxides of nitrogen (NO_x), dense black smoke, Other undetermined compounds

11. Toxicological Information

No information available.

12. Ecological Information

No information available.

13. Disposal considerations

Waste Disposal Method

Waste disposal should be in accordance with existing federal, state and local environmental control laws.

Empty Container Precautions

Recondition or dispose of empty container in accordance with governmental regulations. Empty containers retain product residue; observe all precautions for product. Do not heat or cut container with electric or gas torch.

14. Transportation information

Land transport (DOT)

Non-Regulated

Sea transport (IMDG)

Non-Regulated

Air transport (ICAO/IATA)

Non-Regulated

15. Regulatory Information

United States Federal Regulations

Material Name: CARADOL SC 56-20

Article Number: 3606612

OSHA Hazcom Standard Rating: Non-Hazardous

US. Toxic Substances Control Act: Listed on the TSCA Inventory.

US. EPA CERCLA Hazardous Substances (40 CFR 302):

Components

None

SARA Section 311/312 Hazard Categories:

Non-hazardous under Section 311/312

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III
Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):

Components

None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III
Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required:

Components

None

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes
and Appendix VIII Hazardous Constituents (40 CFR 261):

If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

State Right-To-Know Information

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

Weight %

99 - 100%

Components

Polyether Polyol

CAS-No.

9082-00-2

California Prop. 65:

To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

16. Other Information

NFPA 704M Rating

Health	0
Flammability	1
Reactivity	0
Other	

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

HMIS Rating

Material Name: CARADOL SC 56-20

Article Number: 3606612

Health	0
Flammability	1
Physical Hazard	0

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

* = Chronic Health Hazard

The method of hazard communication for Bayer MaterialScience LLC is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by Bayer MaterialScience LLC as a customer service.

Contact Person: Product Safety Department
 Telephone: (412) 777-2835
 MSDS Number: R302460
 Version Date: 02/10/2007
 Report Version: 1.8

This information is furnished without warranty, express or implied. This information is believed to be accurate to the best knowledge of Bayer MaterialScience LLC. The information in this MSDS relates only to the specific material designated herein. Bayer MaterialScience LLC assumes no legal responsibility for use of or reliance upon the information in this MSDS.

Material Name: CARADOL SC 56-20

Article Number: 3606612

Page: 6 of 6 Report Version: 1.8

LAST CONTAINED LT 791

DESCRIPTION: Cascophen SP-741HE.1, SP-741HE.2, SP-743

1. Chemical Product and Company Identification

DESCRIPTION: Cascophen SP-741HE.1, SP-741HE.2, SP-743
PRODUCT CODE: 357677GEN
PRODUCT TYPE: Liquid PF Resin
APPLICATION: Southern Pine Plywood

This MSDS covers the following product trade names: Cascophen SP-741HE.1, SP-741HE.2, SP-743HE, SP-741HE.3, SP-741HE.4, SP-741HE.2DIB, SP-743HEW, SP-741HE.5

The MSDS is not to be used as a specification sheet. For Specific technical information on any of the above products, a sales specification sheet should be obtained from your Hexion representative.

Part of the CASCO® Brand of Adhesives and Resins from Hexion

Manufacturer/Supplier Information

MSDS prepared by:
Hexion Specialty Chemicals, Inc.
155 West A Street, Bldg. A-1
Springfield, Oregon
97477

For Emergency Medical Assistance
Call Health & Safety Information Services
1-866-303-6949

For additional health and safety or regulatory information, call (541)744-3256.

2. Hazards Identification

2.1 Emergency Overview

Appearance	Clear, reddish-brown liquid
Odor	Slight aromatic

CAUTION!

Will polymerize at high temperatures with some evolution of heat.
Hazardous polymerization may occur.
Causes eye irritation.
May cause allergic skin reaction.

HMIS Rating

HEALTH	=	2 (moderate)
FLAMMABILITY	=	0 (minimal)
REACTIVITY	=	1 (slight)

HMIS® ratings involve data interpretations that may vary from company to company. They are intended only for the rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this

material, all the information contained in this MSDS must be considered.

2.2 Potential Health Effects

Immediate Hazards

INGESTION:	Not expected to be harmful under normal conditions of use. If accidentally swallowed, burns or irritation to mucous membranes, esophagus or GI tract can result.
INHALATION:	Not expected to be harmful under normal conditions of use. However, if allowed to become airborne, may cause irritation of nose, throat and lungs.
SKIN:	May cause irritation on prolonged or repeated contact.
EYES:	Causes irritation.

Delayed Hazards

None of the components present in this product at concentrations equal to or greater than 0.1% have been listed by NTP, classified by IARC, nor regulated by OSHA as a carcinogen.

Note: Residual formaldehyde gas may be released from this product during processing. The amount and level will depend on local conditions of use. Formaldehyde gas is irritating to the eyes and upper respiratory tract and may aggravate existing respiratory conditions or allergies. OSHA has listed formaldehyde as a probable human carcinogen. See the OSHA formaldehyde standard 29 CFR 1910.1048 for further details. The International Agency for Research on Cancer (IARC) has classified formaldehyde as carcinogenic to humans.

3. Composition, Information on Ingredients

The ingredients listed below have been associated with one or more immediate and/or delayed(*) health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THE MSDS.

		% by weight
40798-65-0	Phenol-Formaldehyde Polymer Sodium Salt	10.0 - 30.0
120712-84-7	Formaldehyde, Polymer With Phenol, Potassium Salt	10.0 - 30.0

Any applicable Canadian trade secret numbers will be listed in Section 15.2.

4. First Aid Measures

INGESTION:	If accidentally swallowed, do not induce vomiting. If the individual is rapidly losing consciousness, unconscious or convulsing, do not give anything by mouth. Immediately contact poison control center or hospital emergency room for any other additional treatment directions.
INHALATION:	If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Call a physician.
SKIN:	Flush with plenty of water. Remove contaminated clothing. Call a physician if irritation persists.
EYES:	Immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held apart during irrigation to ensure water contact

with entire surface of eyes and lids. Call a physician.

5. Fire Fighting Measures

Suitable Extinguishing Media: In case of fire, water should be used to keep fire-exposed containers cool. Combustion products may include oxides of carbon and nitrogen.

Will not burn unless water has evaporated. Dried material may burn.

6. Accidental Release Measures

Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in a suitable container. For large spills, use water spray to disperse vapors and flush spill area. Prevent runoff from entering waterways or sewers. Use appropriate Personal Protective Equipment (PPE).

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from eyes, skin and clothing. Wash thoroughly after handling. Always use appropriate Personal Protective Equipment (PPE).

INHALATION: Avoid prolonged or repeated breathing of vapor.

SKIN: Avoid prolonged or repeated contact with skin and clothing.

EYES: Avoid contact with eyes.

7.2 Storage

Store at 20°C (68°F) or lower. Keep tightly closed.

8. Exposure Controls/Personal Protection

8.1 Exposure Guidelines

40798-65-0	Phenol-Formaldehyde Polymer Sodium Salt
ACGIH TLV	None established
OSHA PEL	None established

120712-84-7	Formaldehyde, Polymer With Phenol, Potassium Salt
ACGIH TLV	None established
OSHA PEL	None established

8.2 Exposure Controls

ENGINEERING CONTROLS: The following exposure control techniques may be used to effectively minimize employee exposure: local exhaust ventilation, enclosed system design, process isolation and remote control in combination with appropriate use of personal protective equipment and prudent work practices. These techniques may not necessarily address all issues pertaining to your operations. We, therefore, recommend that you consult with experts of your choice to determine whether or not your programs are adequate.

If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria.

8.3 Personal Protection

Use goggles if contact is likely. Wear impervious gloves as required to prevent skin contact.

9. Physical and Chemical Properties

Appearance	Clear, reddish-brown liquid
Odor	Slight aromatic
Odor threshold	Not available
pH	11.0 - 12.0
Freezing point	Less than 0 °C (32 °F)
Boiling point, 760 mm Hg	Approx. 102 °C (216 °F)
Flash point	Not applicable
Evaporation rate	Approx. 0.4 (Butyl Acetate = 1)
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Vapor pressure	Approx. 22 mm Hg @25 °C (77 °F)
Vapor density	Not available
Specific gravity	1.1800 - 1.1940
Solubility in water	Infinite
Octanol/water partition coefficient	Not available
Autoignition temperature	Not applicable
Viscosity	400 - 1,000 cPs Brookfield

10. Stability and Reactivity

Chemical Stability

Normally stable, but will polymerize at high temperatures with some evolution of heat.

Incompatible Materials

Oxidizers, acids

Hazardous Decomposition Products

CO, CO₂, aldehydes (including formaldehyde), oxides of nitrogen, particulate matter and other organic compounds.

Possibility of Hazardous Reactions

Hazardous polymerization may occur.

11. Toxicological Information

INHALATION: A similar product was found to be non-toxic by inhalation when tested as described in 16 CFR Part 1500.3 (c)(1) and (2).

SKIN: A similar product was not a primary irritant (primary skin irritation index less than 5.0/8.0) when tested as described in 16 CFR Part 1500.41.

EYES: A similar product was severely irritating when tested as described in 16 CFR Part 1500.42.

40798-65-0 Phenol-Formaldehyde Polymer Sodium Salt

LC50: Not available

LD50: Not available

120712-84-7 Formaldehyde, Polymer With Phenol, Potassium Salt

LC50: Not available

LD50: Not available

12. Ecological Information

No data for ecotoxicity has been found. Effects are expected to be minimal. Phenol-formaldehyde polymers have a very low rate of biodegradation. Bioaccumulation is expected to be minimal. Product is initially a mobile liquid which will solidify on aging. Unreacted monomer may be leached into ground water even after normal curing has occurred.

13. Disposal Considerations

Recover free liquid. Absorb residue and dispose of according to local, state/provincial, and federal requirements.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

Regulation: Non regulated

14.2 Canadian Transportation of Dangerous Goods (TDG)

Regulation: Non regulated

14.3 Other Regulations

• **ADR/RID**

Regulation: Non regulated

• **IMO/IMDG**

Regulation: Non regulated

• **IATA (Commercial)**

Regulation: Non regulated

• **IATA (Passenger)**

Regulation: Non regulated

• **ADNR**

Regulation: Non regulated

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

OSHA Hazards Communication Standard 29CFR1910.1200

This material is a "health hazard" and/or a "physical hazard" as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200 "Hazard Communication" Standard.

SARA Title III: Section 311/312

Reactivity hazard

SARA Title III: Section 313 and 40 CFR Part 372

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

None required per SARA TITLE III SECTION 313.

TSCA Section 8(b) Inventory

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by us.

15.2 Canadian Regulations

Workplace Hazardous Materials Information System (WHMIS)

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) and the MSDS contains all the information required by the CPR.

Class D2B

Canadian Environmental Protection Act (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

National Pollutant Release Inventory (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

None required.

16. Other Information

User's Responsibility

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

Disclaimer

The information provided herein was believed by Hexion Specialty Chemicals ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.

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Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals

Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:

Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name Caustic Soda, Shipment Grade
Product Synonym(s)

Chemical Family Alkali
Chemical Formula NAOH
Chemical Name Sodium Hydroxide
EPA Reg Num
Product Use

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Carbon disulfide	75-15-0	<0.1%	Y
Sodium hydroxide	1310-73-2	10-15%	Y
Water	7732-18-5	85-90%	N

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA Inventory list.

3 HAZARDS IDENTIFICATION

Emergency Overview

Orange slightly turbid liquid with foul odor.

DANGER!

FLAMMABLE LIQUID AND VAPOR.

CAUSES EYE, SKIN AND RESPIRATORY TRACT BURNS. MAY CAUSE BLINDNESS.

CAUSES SEVERE DIGESTIVE TRACT BURNS.

EVEN DILUTE SOLUTIONS MAY CAUSE BURNS.

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. This material is a strong alkali that can be destructive to tissue producing severe burns which are not immediately painful or visible. Contact with body tissues may produce deep ulceration, scarring or loss of sight. Concentrations as low as 2-3% can cause injury. Dermatitis (inflammation of the skin) and superficial skin damage can result from repeated or prolonged contact with very dilute solutions. High levels of dust or mist may be corrosive to mucous membranes producing eye or lung injury and chemical pneumonia. Lower concentrations may produce irritation of eyes, nose or upper respiratory tract with coughing, sore throat and shortness of breath. Prolonged exposure may result in ulceration of the nasal passages. If swallowed, this material may cause severe internal injury, characterized by pain in the mouth



Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

and stomach, vomiting, and breathing difficulties. Medical conditions which may be aggravated by exposure to this material include lung disease or limited respiratory capacity.

4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Destroy contaminated shoes.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	NE	
Flash Point	70 F - >150 F	Flash Point Method
Flammable Limits- Upper	NE	
Lower	NE	

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

Contact with metal can form hydrogen gas. Hydrogen is extremely flammable and can form explosive mixtures with air. Closed containers may explode when heated or contents contaminated with water.

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Stop the leak, if possible. Ventilate the space involved. Contain, vacuum up, place in non-sparking container for disposal. Prevent waterway contamination. Construct a dike to prevent spreading. Collect run-off and transfer to drums or tanks for later disposal. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7 HANDLING AND STORAGE

Handling

Do not get in eyes, on skin or clothing. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. To avoid rapid temperature rise, violent spattering, or explosive eruptions: always add caustic to water when mixing. Never add water to a caustic when mixing. Heat water to 80-100 F before adding product. Add small amounts of product slowly and evenly over surface of water with constant stirring. Never increase concentration of product by more than 5% with any single



Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

7 HANDLING AND STORAGE

addition. Water should not exceed 160 F during addition.

Storage

Do NOT store near strong acids.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems. Monitor carbon monoxide and oxygen levels in tanks and enclosed spaces.

Eye / Face Protection

Where there is potential for eye contact, wear a face shield, chemical goggles, and have eye flushing equipment immediately available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

Respiratory Protection

Avoid breathing vapor or mist. When airborne exposure limits are exceeded (see below), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

Exposure Limit		Value
Sodium hydroxide		
ACGIH CEILING	-	2 mg/m3
OSHA TWA PEL	-	2 mg/m3
Carbon disulfide		
ACGIH Skin designator	-	Y
ACGIH TWA	-	1 ppm
OSHA Ceiling PEL	-	30 ppm
OSHA TWA PEL	-	20 ppm

-Only those components with exposure limits are printed in this section.

-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.

-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.

-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.



Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Orange slightly turbid liquid with foul odor.
pH	NE
Specific Gravity	1.073 @ 15 C
Vapor Pressure	30 @ 100 F
Vapor Density	NA
Melting Point	NA
Freezing Point	NE
Boiling Point	NE
Solubility In Water	99.98%

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

Reacts violently or explosively with water, acids and organic materials such as chlorinated hydrocarbons. Toxic carbon monoxide gas can form upon contact with food or beverage products.

Hazardous Decomposition Products

Will react with some metals such as aluminum, tin or zinc to generate hydrogen gas. Hydrogen gas can result in explosive hazards in confined spaces.

11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

Sodium Hydroxide

Single exposure (acute) studies indicate that this material is slightly toxic if absorbed through the skin (rat LD50 1,350 mg/kg; dry sodium hydroxide) and corrosive to rabbit eyes and skin. Many publications in the scientific literature confirm that this material is corrosive to all tissues. Repeated inhalation resulted in lung damage in rats. No tumors were seen in long-term animal studies. No genetic changes were observed in tests using bacteria.

No significant increases in mortality in relation to duration or intensity of exposures were reported in an epidemiologic study of a small group of workers exposed to caustic dust for 30 years or more. Massive ingestion of this material has been implicated as causing esophageal cancer. Squamous cell carcinomas of the esophagus occurred approximately 12-42 years later in individuals who survived accidental childhood ingestion and are likely due to the tissue destruction and possible scarring of the esophagus rather than a direct effect of this material.

Carbon Disulfide

Single exposure (acute) studies indicate that this material is slightly toxic to rats if swallowed (LD50 3,188 mg/kg) or rabbits if absorbed through skin (LD50 2,025 mg/kg), practically non-toxic to rats if inhaled (1-hr LC50 40 mg/l), and severely irritating to rabbit skin and eyes. The neurological effects of long-term exposure have been documented in occupational populations who were generally exposed to levels of 20 ppm or more in viscose rayon production. Exposed workers have experienced headaches, nausea, dizziness, tiredness, memory loss, sleep disturbances, irritability and other psychological symptoms in the early stages of intoxication. Long-term exposure has resulted in decreased nerve conduction velocities, memory loss,



Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

11 TOXICOLOGICAL INFORMATION

peripheral neuropathy (numbness) in the lower legs and forearms, tremors, poor coordination and personality disorders. In addition, several studies have shown adverse effects on the heart including increases in atherosclerosis, death from coronary or ischemic heart disease and blood pressure. Other studies have indicated that long-term overexposure can cause adverse effects on the eyes including increased hemorrhages or microaneurysms of the retina. Studies of occupationally exposed workers have suggested that long-term exposure to higher levels may cause reproductive effects. Male workers had decreased libido, reduced sperm count and altered endocrine function and female workers reported menstrual irregularities. Sperm from exposed workers have shown alterations indicative of spermatogenic damage. There is conflicting evidence whether increased pregnancy complications and a higher frequency of spontaneous abortions are related to exposures in female workers.

Animal studies have confirmed neurological effects. Rats exposed for long periods to high levels showed decreased motor conduction velocity, hindlimb motor defects, peripheral nerve swelling and degeneration. Repeated exposure of monkeys has resulted in reduced visual acuity. Following inhalation exposure in male rats, minor reproductive effects such as decreased sperm counts and abnormal mating behavior, but no pathological changes were noted in testes. A two-generation reproduction study in exposed female rats showed no reduction in fertility, but mothers exposed to high dose levels had reduced pup viability. Multiple developmental toxicity studies in rats and rabbits have presented evidence of increased birth defects and embryotoxicity at high dose levels; however, exposures at levels that are not maternally toxic generally do not cause birth defects, although developmental effects have been observed. No genetic changes were observed in tests using bacteria, but have been observed in animal cells.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

Data on this material and/or its components are summarized below.

Sodium Hydroxide

Data from several species of fish showed a range of tolerance (brook trout > spotfin and Lake Emerald shiners > minnows > mosquitofish > goldfish) that was most likely related to changes in the pH produced by addition of sodium hydroxide to the water. The minimum lethal concentration for minnows, Mayfly larvae and Daphnia was 100 ppm and for Chironomus larvae, 700 ppm.

Carbon Disulfide

This material is moderately toxic to *Daphnia magna* (LC50 2.1 mg/l). It is moderately toxic to guppies (LC50 4 mg/l) and slightly toxic to green algae (LC50 21 mg/l). It is practically non-toxic to mosquitofish (LC50 135 mg/l) and bacteria (LC50 341 mg/l).

Chemical Fate Information

Data on this material and/or its components are summarized below.

Sodium Hydroxide

No data were available, but this material is a strong alkali that easily dissolves in water with resulting acid/base chemistry.



Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Consult with environmental engineer or professional to determine if neutralization is appropriate and for handling procedures for residual materials. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14 TRANSPORT INFORMATION

DOT Name	Flammable Liquid, Corrosive, NOS
DOT Technical Name	(Sodium Hydroxide; Carbon Disulfide)
DOT Hazard Class	3, 8
UN Number	UN 2924
DOT Packing Group	PG II
RQ	Sodium Hydroxide 1000# (dry basis); Carbon Disulfide 100#
DOT Special Information	Subsidiary hazard: 8 Corrosive On a waste manifest, add the word "Waste"

15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	Y
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

The components of this product are all on the TSCA Inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities

	CERCLA RQ	SARA TPQ
Sodium hydroxide	1000 LBS	
Water	NE	
Carbon disulfide	100 LBS	10000 LBS

SARA Title III, Section 313

This product does contain chemical(s) which are defined as toxic chemicals under and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. See Section 2

Carbon disulfide

SARA Title III, Section 302

This product does contain chemical(s), as indicated below, currently on the Extremely Hazardous Substance List, Section 302, SARA Title III. See Section 2 for further details regarding concentrations and registry numbers.

Carbon disulfide

California Prop 65 - Developmental Toxin

This product does contain the following chemical(s), as indicated below, currently on the California List of Developmental Toxins.

Carbon disulfide

Massachusetts Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.



Caustic Soda, Shipment Grade

Material Safety Data Sheet

Arkema Inc.

Massachusetts Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Carbon disulfide
Sodium hydroxide

New Jersey Right to Know

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

Carbon disulfide
Sodium hydroxide

Pennsylvania Environmental Hazard

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Environmental Hazard List.

Carbon disulfide
Sodium hydroxide

Pennsylvania Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

Carbon disulfide
Sodium hydroxide

16 OTHER INFORMATION

Revision Information

Revision Date	23 FEB 2007	Revision Number	6
Supersedes Revision Dated	07-NOV-2006		

Revision Summary

Moved from Retired to Active 03.

Key

NE= Not Established NA= Not Applicable (R) = Registered Trademark

Miscellaneous

NOTE: Toxic carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and cause death.

Arkema Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use are beyond the control of Arkema Inc., Arkema Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

SOICHEM

Material Safety Data Sheet



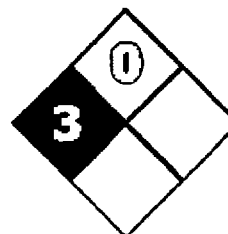
PPE



HMIS

	3
Fire Hazard	0
Reactivity	1

NFPA



Preparation Date 03-Jun-2008

Revision Date

Revision Number 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code L-GR CAUSTIC 18-30%
Product Name Lo-Grade Caustic 18-30%
Contact Manufacturer
Sochem Solutions, Inc.
P. O. box 1912
Gonzales, LA 70707
225-644-3180
Emergency Telephone Number CHEMTREC: (call 24 Hours) 1-800-424-9300
or for International calls dial 703-527-3887 (collect calls accepted)

Application of Substance/the preparation Industrial Cleaning Chemical

2. HAZARDS IDENTIFICATION

Emergency Overview

- The product causes burns of eyes, skin and mucous membranes

Eye contact	• Causes eye burns
Skin contact	• It will cause burns and irritation
Inhalation	• Avoid breathing vapors or mists
Ingestion	• Severe damage to the gastrointestinal tract
Principle Routes of Exposure	Eye contact Skin contact Ingestion Inhalation
Aggravated Medical Conditions	• Existing dermatitis

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight %	EINECS
50% Liquid caustic soda	1310-73-2	18-30	-

29CFR Part 1910, Subpart Z (OSHA) Toxic and Hazardous Substances
Part 355, Appendix A (Externly Hazardous Substances) EPA
TLV for Chemcial Substances
Annual Report on Carcinogens
Supplier: Material Safety Data Sheets

4. FIRST AID MEASURES

- | | |
|---------------------|---|
| Skin Contact | <ul style="list-style-type: none">• Wash with Large amounts of water |
| Eye Contact | <ul style="list-style-type: none">• Flush with water for 15 mintues• Consult a physician |
| Inhalation | <ul style="list-style-type: none">• Remove to fresh air• If breathing has stopped, call a physician |
| Ingestion | <ul style="list-style-type: none">• Do not induce vomiting• Drink large quantity of water, and consult physician |

5. FIRE-FIGHTING MEASURES

- | | |
|-------------------------------------|--|
| Suitable Extinguishing Media | <ul style="list-style-type: none">• Use extinguishing measures that are appropriate to local circumstances and the surrounding environment |
| Special Protective Equipment | <ul style="list-style-type: none">• None |

6. ACCIDENTAL RELEASE MEASURES

- | | |
|----------------------------------|---|
| Personal Precautions | <ul style="list-style-type: none">• Ensure adequate ventilation |
| Environmental Precautions | <ul style="list-style-type: none">• Stop flow and contain spill• Small spill: Pick up with absorbent material• Neutralize before disposal |
| Methods for Clean-up | <ul style="list-style-type: none">• Neutralized• Flush with water to sewer.• Follow Federal, State and Local regulations• Large spill reclaim, put in containers |

7. HANDLING AND STORAGE**Handling****Safe Handling Advice**

- Handle in accordance with good industrial hygiene and safety practice

Storage

- Keep container tightly closed
- Do not store in aluminum containers or use with soft metal parts.

Incompatible products

- Strong Acid

Specific use(s)

- None

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Chemical Name	OSHA PEL	ACGIH TWA
50% Liquid caustic soda	2 mg/m ³	N/A

Personal Protective Equipment**Respiratory Protection**

- In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit

Hand Protection

- Rubber gloves
- Neoprene gloves
- Any chemical resistant gloves

Eye/face Protection

- Chemical goggles
- Face-shield

Skin Protection

- Wear protective gloves/clothing
- Rubber or plastic boots

General Hygiene Considerations

- Avoid breathing mist

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Semi viscous Clear Liquid	Color	• Clear
Physical State	• Semi viscous liquid	pH	14
Flash Point	N/A	Autoignition Temperature	
Boiling Point/Range	288°F		
Solubility	Complete in water	Vapor Density	Not est.
Bulk Density	10.60	Viscosity	Not available

10. STABILITY AND REACTIVITY**Chemical Stability**

- Stable

Incompatible Materials

- Strong acids

Hazardous Decomposition Products

- None under normal use

Hazardous Polymerization

- Hazardous polymerisation does not occur

Possibility of Hazardous Reactions

- None under normal processing

11. TOXICOLOGICAL INFORMATION**Local effects****cause irritation****Eye irritation****Inhalation****Ingestion**

Causes burns. Irritating to skin. dryness of skin.

Corrosive to the eyes and may cause severe damage including blindness.

May cause irritation of respiratory tract.

Ingestion causes burns of the upper digestive and respiratory tracts.

Long term Effects**12. ECOLOGICAL INFORMATION****Ecotoxicity effects**

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants

Additional ecological information

No information available

13. DISPOSAL CONSIDERATIONS**Waste Disposal Method**

Follow Federal, state and Local regulations.. Large Spill: Reclaim, put in containers. Neutralize before disposal. Flush spill area with water and neutralize with dilute acid if necessary. Do not use aluminum equipment.. Small Spill: Pick up with absorbent material.. Neutralize. Flush with water.

Contaminated Packaging

Keep container closed when not in use.

Further information

Wash contaminated clothing before reuse

14. TRANSPORT INFORMATION**DOT****Proper Shipping Name**

HM-SODIUM HYDROXIDE, SOLUTION CORROSIVE LABEL

Hazard Class

8

UN-No

1824

Packing Group

II

ERG Code

ERG-154

15. REGULATORY INFORMATION**R -phrase(s)**

None

S -phrase(s)

None

Symbol(s)

Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 99/45/EC

EU Labeling

None

Contains

None

U.S. Inventories

Chemical Name	TSCA	NJRTK	MRTKL	PARTK
50% Liquid caustic soda		N/A		

International Inventories

Chemical Name	TSCA	DSL	EINECS	ENCS	IECSC	KECL	PICCS	AICS
50% Liquid caustic soda	-	-	-	-	-	-	-	-

16. OTHER INFORMATION

Prepared By

Sochem Solutions, Inc.

End of MSDS

MATERIAL SAFETY DATA SHEET



SECTION 1 - PRODUCT AND COMPANY INFORMATION

PPG Kansai Automotive Finishes (PKAF)
5875 New King Court
Troy, MI 48098

EMERGENCY PHONE NUMBERS (412) 434-4515 (U.S.)
(24 hours/day):

(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
0532-3889090 (China)

TECHNICAL INFORMATION: 1-800-245-2590 (CLEVELAND, OH) 8:00 a.m. - 5:00 p.m. EST
PRODUCT SAFETY/MSDS INFORMATION: (412) 492-5555 7:00 a.m. - 4:30 p.m. EST
Product ID: CMS611 (0019-F1)
PRODUCT NAME: CELLOSOLVE ACETATE
SYNONYMS: None
ISSUE DATE: 05/26/2005
EDITION NO.: 1
CHEMICAL: SOLVENT
FAMILY:

EMERGENCY OVERVIEW:

Combustible. Keep away from heat, sparks, flames, and other sources of ignition. Do not smoke. CAUSES EYE IRRITATION. MAY CAUSE SLIGHT SKIN IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN. VAPOR AND/OR SPRAY MIST HARMFUL IF INHALED. HARMFUL IF SWALLOWED.

SECTION 2 - COMPOSITION INFORMATION

The following ingredient(s) marked with an "x" are considered hazardous under applicable U.S. OSHA and/or Canadian WHMIS regulations. If no ingredients are listed, then there are no U.S. OSHA and/or Canadian WHMIS hazardous ingredients in this product.

Material/ CAS Number	Percent	Hazardous
2-ETHOXYETHYLACETATE 111-15-9	60- 100	X

SECTION 3 - HAZARDS IDENTIFICATION

ACUTE OVEREXPOSURE EFFECTS

EYE CONTACT:

Causes eye irritation. Redness, itching, burning sensation and visual disturbances may indicate excessive eye contact.

SKIN CONTACT:

May cause slight skin irritation. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact.

SKIN ABSORPTION:

May be harmful if absorbed through the skin.

INHALATION:

Vapor and/or spray mist harmful if inhaled.

INGESTION:

Harmful if swallowed.

SIGNS & SYMPTOMS OF OVEREXPOSURE:

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Eye watering, headaches, nausea, dizziness and loss of coordination are indications that solvent levels are too high. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Not applicable.

CHRONIC OVEREXPOSURE EFFECTS

Avoid long-term and repeated contact.

Repeated exposure to vapors above recommended exposure limits (see Section 8) may cause irritation of the respiratory system and permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. This product contains an ethyl and/or methyl derivative of an ethylene series glycol ether and/or acetate which has been shown to cause adverse effects on the kidneys, liver, blood and/or blood-forming tissues, birth defects, and reproductive organ damage.

The effects of long-term, low level exposures to this product have not been determined. Safe handling of this material on a long-term basis should emphasize the prevention of all contact with this material to avoid any effects from repetitive acute exposures. See Section 11, of this MSDS for a detailed list of chronic health effects information available on individual ingredients in this product.

SECTION 4 - FIRST AID MEASURES

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available.

EYE CONTACT:

Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. If irritation persists, contact a poison control center, emergency room, or physician as further treatment may be necessary.

SKIN CONTACT:

Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. If any symptoms persist, contact a poison control center, emergency room, or physician as further treatment may be necessary.

INHALATION:

Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

INGESTION:

Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

SECTION 5 - FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASHPOINT: 125 Degrees F (52 Degrees C)

FLASHPOINT TEST METHOD:

Pensky-Martens Closed Cup

UEL: Not Available.

LEL: 1.8

AUTOIGNITION TEMPERATURE:

Not Available.

EXTINGUISHING MEDIA:

Use National Fire Protection Association (NFPA) Class B extinguishers (carbon dioxide, dry chemical, or universal aqueous film forming foam) designed to extinguish NFPA Class II combustible liquid fires. Water spray may be ineffective. Water spray may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

PROTECTION OF FIREFIGHTERS:

Fire-fighters should wear self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Keep this product away from heat, sparks, flame, and other sources of ignition (i.e., pilot lights, electric motors, static electricity). Invisible vapors can travel to a source of ignition and flash back. Do not smoke while using this product. Keep containers tightly closed when not in use. Closed containers may explode when overheated. Do not apply to hot surfaces. Toxic gases may form when this product comes in contact with extreme heat. May produce hazardous decomposition products when exposed to extreme heat. Extreme heat includes, but is not limited to, flame cutting, brazing, and welding.

SECTION 6 - ACCIDENTAL RELEASE MEASURE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Provide maximum ventilation. Only personnel equipped with proper respiratory, skin, and eye protection should be permitted in the area. Remove all sources of ignition. Take up spilled material with sand, vermiculite, or other noncombustible absorbent material and place in clean, empty containers for disposal. Only the spilled material and the absorbant should be placed in this container.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:

Vapors may collect in low areas. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts. Containers should be grounded when pouring. Avoid free fall of liquids in excess of a few inches.

STORAGE:

Do not store above 120 degrees F.(48 degrees C.). Store large quantities in buildings designed and protected for storage of NFPA Class II combustible liquids.

SECTION 8 - EXPOSURE CONTROLS & PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 8 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

PERSONAL PROTECTIVE EQUIPMENT

EYES:

Wear chemical-type splash goggles when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapors.

SKIN/GLOVES:

Wear protective clothing to prevent skin contact. Apron and gloves should be constructed of: butyl rubber. No specific permeation/degradation testing have been done on protective clothing for this product. Recommendations for skin protection are based on infrequent contact with this product. For frequent contact or total immersion, contact a manufacturer of protective clothing for appropriate chemical impervious equipment. Clean contaminated clothing and shoes.

RESPIRATOR:

Overexposure to vapors may be prevented by ensuring proper ventilation controls, vapor exhaust or fresh air entry. A NIOSH- approved air purifying respirator with the appropriate chemical cartridges or a positive-pressure, air-supplied respirator may also reduce exposure. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against which the respirator is effective, its limitations, and how it is to be properly fitted and used. Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

GENERAL HYGIENE - ESTABLISHED EXPOSURE LIMITS

If Threshold Limit Values (TLVs) have been established by ACGIH, OSHA, Ontario or PPG, they will be listed below. These limits are intended for use in the practice of industrial hygiene as guidelines or recommendations in the control of potential workplace health hazards. These limits are not a relative index of toxicity and should not be used by anyone without industrial hygiene training.

Material/ CAS Number	Percent	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL
2- ETHOXYETHYLAC ETATE 111-15-9	60- 100	S- 5 ppm	Not established	S- 100 ppm	Not established

Key: OSHA=Occupational Safety and Health Administration;
PEL=Permissible Exposure Limit; Ceiling=PEL Ceiling Limit; STEL=PEL Short-Term Exposure Limit; Skin=OSHA Skin Designation.

Material/ CAS Number	Percent	Ontario TWA	Ontario STEL	PPG IPEL	PPG STEL
2- ETHOXYETHYLAC ETATE 111-15-9	60- 100	S- 5 ppm	Not established	Not established	10 PPM

Key: ACGIH=American Conference of Governmental Industrial Hygienists; OSHA=Occupational Safety and Health Administration;
TLV=Threshold Limit Value; TWA=Time Weighted Average;
PEL=Permissible Exposure Limit; IPEL=Internal Permissible Exposure Limit; Ceiling=TLV or PEL Ceiling Limit; STEL=TLV or PEL Short-Term Exposure Limit; Skin= Skin Absorption Designation. [C- Ceiling Limit; S- Potential Skin Absorption; R-Respirable Dust]
Additional Information Not applicable.

SECTION 9 - PHYSICAL & CHEMICAL PROPERTIES (FORMULA VALUES, NOT SALES SPECIFICATIONS)

SPECIFIC GRAVITY:	.975
PHYSICAL STATE:	Liquid
Percent Solids:	.00
Percent Volatile by Volume:	100.000
pH:	Not available.
ODOR THRESHOLD:	Not available.
Vapour Pressure:	1.2 mmHg
ODOR/APPEARANCE:	Non-viscous liquid with an odor characteristic of the ingredients listed in Section 2.
VAPOR DENSITY:	HEAVIER THAN AIR
Evaporation Rate:	21
BOILING POINT OR RANGE:	313 - 320Degrees F
Freezing Point or Range:	Not Applicable.
Melting Point or Range(°C):	Not Applicable.
Octanol/Water Partition Coefficient:	Not Applicable.
WEIGHT PER GALLON:	8.1 (U.S.) / 9.75 (IMPERIAL)

SECTION 10 - STABILITY AND REACTIVITY

STABILITY:

This product is normally stable and will not undergo hazardous reactions.

CONDITIONS TO AVOID:

None Known.

INCOMPATIBLE MATERIALS:

Avoid contact with strong alkalis, strong mineral acids, or strong oxidizing agents.

HAZARDOUS POLYMERIZATION:

None Known.

HAZARDOUS DECOMPOSITION PRODUCTS:

- Carbon monoxide - Carbon dioxide

Waste material must be disposed of in accordance with federal, state, provincial and local environmental control regulations. Empty containers should be recycled by an appropriately licensed reconditioner/salvager or disposed of through a permitted waste management facility. Additional disposal information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

SECTION 14 - TRANSPORTATION INFORMATION

Proper Shipping Name: NOT AVAILABLE
NOS Technical Name: NOT AVAILABLE
Hazard Class: N.A.
Subsidiary Class(es): N.A.
UN Number: N.A.
Packing Group: N.A.

USA - RQ Hazardous Substances: NOT AVAILABLE
USA-RQ Hazardous Substance: NOT AVAILABLE
Threshold Ship Weight: NOT AVAILABLE
Marine Pollutant Name: NOT AVAILABLE

SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Material/ CAS Number	Percent	ORAL LD50 (g/kg)	DERMAL LD50 (g/kg)	INHALATION LC50 (mg/l)
2- ETHOXYETHYLAC ETATE 111-15-9	60- 100	3.90 g/kg	Not Available	16.23 mg/L. 4 h

CHRONIC TOXICITY

Target Organs:

- Bone marrow and blood tissues - Blood - Kidney - Liver - Reproductive - Teratogen - Brain - Central nervous system - Lung

Mutagenicity Toxicity:

This has not been tested for this product.

Reproductive Toxicity:

This has not been tested for this product.

SECTION 15 - REGULATORY INFORMATION

INVENTORY STATUS

U.S. TSCA: This product and/or all of its components are listed on the U.S. TSCA Inventory or is otherwise exempt from TSCA Inventory reporting requirements.

FEDERAL REGULATIONS

US Regulations

Material/ CAS Number	Percent	CERCLA HS - RQ (LBS)	SARA EHS - TPQ (LBS)	SARA 313
2- ETHOXYETHYLAC ETATE 111-15-9	60- 100	Not Listed	Not Listed	Not Listed

SUPPLEMENTAL HEALTH INFORMATION:

Material/ CAS Number	Percent	Ingredient Specific Animal Data:
2- ETHOXYET HYLACETA TE 111-15-9	60- 100	This product contains an ethylene series glycol ether and/or acetate which has been shown to cause adverse effects on the kidneys, liver, blood and/or blood-forming tissue.

SECTION 12 - ECOLOGICAL INFORMATION

POTENTIAL ENVIRONMENTAL EFFECTS

Ecotoxicity: No Information Available.

ENVIRONMENTAL FATE

Mobility: No Information Available.
Biodegradation: No Information Available.
Bioaccumulation: No Information Available.

PHYSICAL/CHEMICAL

Hydrolysis: No Information Available.
Photolysis: No Information Available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Provide maximum ventilation, only personnel equipped with proper respiratory and skin and eye protection should be permitted in the area. Take up spilled material with sawdust, vermiculite, or other absorbent material and place in containers for disposal.

SARA 311/312

Health (acute): Yes
Health (chronic): Yes
Fire (flammable): Yes
Pressure: No
Reactivity: No

WHMIS HAZARD CLASS: - Class B, Division 3 - Class D, Division 2, Subdivision A

STATE/PROVINCIAL REGULATIONS

CALIFORNIA PROP. 65: WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Additional Information

Key: IARC- International Agency on the Research of Cancer; ACGIH- American Conference of Governmental Industrial Hygienists; NTP- National Toxicology Program *Denotes chemical as NTP Known Carcinogen; + Denotes NTP Possible Carcinogen; OSHA- Occupational Safety and Health Administration.

SECTION 16 - OTHER INFORMATION

Hazard Rating Systems

NFPA Rating: 2 20

HMIS Rating: 2*20

Rating System: 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe, *Chronic Effects.

PPG Kansai Automotive Finishes (PKAF)
5875 New King Court
Troy, MI 48098

Product ID: CMS611 (0019-F1)
PRODUCT NAME: CELLOSOLVE ACETATE

HMIS=Hazardous Materials Identification System; NFPA=National Fire Protection Association;

Safe handling of this product requires that all of the information on the MSDS be evaluated for specific work environments and conditions of use.

PREPARED BY: Product Safety Department
REASON FOR REVISION: Date. Edition.
Updated MSDS
format.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200), the supplier notification requirements of SARA Title III, Section 313 and other applicable right-to-know regulations.

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

CMS611 001001 (00168311.009)(05/31/05)
000315, 001, 0019

*** END OF MSDS ***



Material Safety Data Sheet

Catalog Number: 204269
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 204269

Product name: CETYL ALCOHOL

Synonyms: 1-Hexadecanol; Adol; Alcohol C-16; Hexadecyl Alcohol; Palmityl Alcohol

Supplier:

MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
CETYL ALCOHOL	36653-82-4	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin

Inhalation: May cause irritation of respiratory tract

Ingestion: May be harmful if swallowed.

Skin contact: May cause allergic skin reaction

Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined
NFPA rating:	
NFPA Health:	0
NFPA Flammability:	0
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:	
ROOM TEMPERATURE	
Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: Breathing apparatus only if aerosol or dust is formed.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.

Eye protection: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical state:	Solid
Formula:	C16H34O
Melting point/range:	54-56°C
Boiling point/range:	179-181°C at 10 mm
Density:	No data available
Vapor pressure:	3.06 x 10 ⁻⁶ mm Hg at 30 °C
Evaporation rate:	No data available
Vapor density:	No data available

Catalog Number: 204269

Product name: GETYL ALCOHOL

Page 2 of 5

EPAPA005000753

Solubility (in water):
Flash point:
Autoignition temperature:

Insoluble
Not determined
Not determined

10. STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.
Polymerization: None under normal processing.
Hazardous decomposition products: Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid: Strong oxidising agents
 Strong acids
Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components
CETYL ALCOHOL

RTECS Number:
MM0225000

Selected LD50s and LC50s
 Oral LD50 Rat : 5 gm/kg
 Oral LD50 Mouse : 3200 mg/kg
 Dermal LD50 Rabbit : >2600 mg/kg

Chronic toxicity: Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects: May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation: No data is available on the product itself.
Carcinogenic effects: No data is available on the product itself.
Mutagenic effects: No data is available on the product itself.
Reproductive toxicity: No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility: No data available
Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
CETYL ALCOHOL	Not Listed	Not Listed	Not Listed
Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
CETYL ALCOHOL	Not Listed	Not Listed	Not Listed
Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
CETYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
CETYL ALCOHOL	Not Listed	indicator 4; Fully and ICCA sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
CETYL ALCOHOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging:

Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
CETYL ALCOHOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
CETYL ALCOHOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
CETYL ALCOHOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present

Catalog Number: 204269

Product name: CETYL ALCOHOL

Page 4 of 5

Inventory - China:	Present
EU EINECS List -	253-149-0; C16H34O
Inventory - Japan:	2-217; 2-3704
Korean KECL:	KE-18460
Philippines PICCS:	Present

U.S. regulations:**Components**

CETYL ALCOHOL

California Proposition 65	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
-	Not Listed	Not Listed	Not Listed

Components

CETYL ALCOHOL

Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
Not Listed	Not Listed	Not Listed	Not Listed

Components

CETYL ALCOHOL

SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
Not Listed	Not Listed	None	None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable.

However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

MSDS Number: C4092 * * * * * Effective Date: 04/02/07 * * * * * Supersedes: 08/10/04

**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151

CHEMTREC: 1-800-424-9300

National Response in Canada

CANUTEC: 613-996-6666

Outside U.S. And Canada

Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

CHOLINE CHLORIDE

1. Product Identification

Synonyms: Ethanaminium, 2-hydroxy-N,N,N-trimethyl-, chloride; biocolina; Hepacholine; Lipotril; Choline Chlorhydrate.

CAS No.: 67-48-1

Molecular Weight: 139.63

Chemical Formula: HOCH₂CH₂N(CH₃)₃Cl

Product Codes: 1582

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
-----	-----	-----	-----
Choline Chloride	67-48-1	98 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE

IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.**SAF-T-DATA^(tm)** Ratings (Provided here for your convenience)

Health Rating: 1 - Slight

Flammability Rating: 1 - Slight

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES

Storage Color Code: Green (General Storage)
-----**Potential Health Effects**

Information on the human health effects from exposure to this substance is limited.

Inhalation:

No information found, but compound should be handled as a potential health hazard.

Ingestion:

No information found, but compound should be handled as a potential health hazard.

Skin Contact:

May cause irritation with redness and pain.

Eye Contact:

May cause irritation, redness and pain.

Chronic Exposure:

No information found.

Aggravation of Pre-existing Conditions:

No information found.

4. First Aid Measures**Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

Ingestion:

Give several glasses of water to drink to dilute. If large amounts were swallowed, get medical advice.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

5. Fire Fighting Measures

Fire:

As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.

Explosion:

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

None established.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R

or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White crystals.

Odor:

Slight amine odor.

Solubility:

Soluble in water.

Specific Gravity:

No information found.

pH:

Aqueous solution is neutral or slightly acid.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

No information found.

Melting Point:

244 - 247C (471 - 477F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

May produce carbon monoxide, carbon dioxide, nitrogen oxides and hydrogen chloride when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizers.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 3400 mg/kg Investigated as a mutagen.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Choline Chloride (67-48-1)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Choline Chloride (67-48-1)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	DSL	NDSL	Phil.
Choline Chloride (67-48-1)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302- RQ	TPQ	-SARA 313- List	Chemical Catg.
Choline Chloride (67-48-1)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Choline Chloride (67-48-1)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0

Label Hazard Warning:

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

Label Precautions:

Avoid breathing dust.
 Avoid contact with eyes, skin and clothing.
 Keep container closed.
 Use with adequate ventilation.
 Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. Get medical attention if irritation develops or persists.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

SIGMA-ALDRICH

Material Safety Data Sheet

Version 3.0
Revision Date 07/14/2007
Print Date 09/06/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Citric acid**

Product Number : 251275
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₆H₈O₇
Molecular Weight : 192.12 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
Citric acid			
77-92-9	201-069-1	-	-

3. HAZARDS IDENTIFICATION

Emergency Overview
OSHA Hazards
Irritant

HMIS Classification
Health Hazard: 2
Flammability: 0
Physical hazards: 0

NFPA Rating
Health Hazard: 2
Fire 0
Reactivity Hazard 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point no data available

Ignition temperature no data available

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

Environmental precautions

Do not let product enter drains.

Methods for cleaning up

Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment**Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point	155 - 157 °C (311 - 315 °F)
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	8 %(V)
Water solubility	no data available

10. STABILITY AND REACTIVITY**Storage stability**

Stable under recommended storage conditions.

Materials to avoid

Oxidizing agents, Bases, Reducing agents, Nitrates

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.

Carbon oxides

11. TOXICOLOGICAL INFORMATION**Acute toxicity**

LD50 Oral - rat - 3,000 mg/kg

Irritation and corrosion

Skin - rabbit - Mild skin irritation - 24 h

Eyes - rabbit - Severe eye irritation - 24 h

Sensitisation

Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Chronic exposure

no data available

Signs and Symptoms of Exposure

Vomiting, Diarrhoea, Damage to tooth enamel., Dermatitis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

12. ECOLOGICAL INFORMATION**Elimination information (persistence and degradability)**

no data available

Ecotoxicity effects

Toxicity to fish LC50 - *Leuciscus idus melanotus* - 440 mg/l - 48 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS**Product**

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**OSHA Hazards**

Irritant

TSCA Status

On TSCA Inventory

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

No Components Listed

Pennsylvania Right To Know Components

Citric acid

CAS-No.
77-92-9

Revision Date

New Jersey Right To Know Components

Citric acid

CAS-No.
77-92-9

Revision Date

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION**Further information**

Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only., The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

TP 4025

MATERIAL SAFETY DATA SHEET



Page: 1

DATE PREPARED: 11/22/1999

MSDS No: L001

Citric Acid Crystal

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: Citric Acid Crystal
Product Code: L001
Product Name: Citric Acid, Anhydrous
Chemical Family: Organic acid, Chelant
Molecular Formula: $\text{HOC}(\text{COOH})(\text{CH}_2\text{COOH})_2$

MANUFACTURER:

HydroChem Industrial Services, Inc.
900 Georgia Ave.
Deer Park, TX 77536
Customer Service: (800) 934-9376

24 HR. EMERGENCY TELEPHONE NUMBERS:

Emergency Contact: HydroChem ER
Emergency Phone: (800) 569-4889

COMMENTS:

EFFECTIVE DATE: 1/1/00

2. COMPOSITION/INFORMATION ON INGREDIENTS

	wt. %	CAS Registry #
Citric Acid, Anhydrous	100	77-92-9

COMMENTS:

Product Exposure Limits:
Nuisance Dust - OSHA PEL: 15 mg/m³ ACGIH TLV: 10 mg/m³
Respirable Fraction - OSHA PEL: 5 mg/m³

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

IMMEDIATE CONCERNS:

No hazard in normal industrial use.
Dust may be irritating to eyes and respiratory tracts.

4. FIRST AID MEASURES

EYES:

Immediately flush eyes with water for 30 minutes while holding eyelids open. Seek medical attention.



Page: 2
DATE PREPARED: 11/22/1999
MSDS No: L001
Citric Acid Crystal

SKIN:

Immediately wash with soap and water. Rinse thoroughly. Seek medical attention if effects occur.
Launder contaminated shoes and clothing before reuse.

INGESTION:

If swallowed, give 2 glasses of milk (preferred) or water and consult physician.

INHALATION:

Remove to fresh air. See a doctor if effects occur.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: >200°F 93°C
Flammable Limits: Not determined
Autoignition Temperature: Not Determined

EXTINGUISHING MEDIA:

Use alcohol foam, carbon dioxide, dry chemical or water spray when fighting fires involving this material.

HAZARDOUS COMBUSTION PRODUCTS:

Oxides of carbon and harmful organic chemical fumes.

FIRE FIGHTING EQUIPMENT:

As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective clothing to prevent contact with skin and eyes.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES:

Scoop into appropriate containers.
Flush residual with plenty of water.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:

Refer to Section 8.

STORAGE:

No special precautions required.
Avoid wetting.
Store away from oxidizers.



Page: 3

DATE PREPARED: 11/22/1999

MSDS No: L001

Citric Acid Crystal

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Ventilation - General and local ventilation are required.

PERSONAL PROTECTION

EYES AND FACE:

Chemical goggles required and an eye wash in work area.

RESPIRATORY:

Use NIOSH approved respirator with dust and mist protection.

PROTECTIVE CLOTHING:

Clean body covering and chemical resistant gloves.

OTHER USE PRECAUTIONS:

Safety shower and eye wash in the work area.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Powder

Color: White

pH: 0.6

Percent Volatile: Not Established

Vapor Pressure: Not Available

Melting Point: 307°F 153°C

Solubility in Water: Soluble

Specific Gravity: 1.54

COMMENTS:

pH: pH listed above is for a 50% aqueous solution

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

HAZARDOUS DECOMPOSITION:

When heated strongly or burned, oxides of carbon and harmful organic chemical fumes are released.

INCOMPATIBLE MATERIALS:

Oxidizers, bases. Can be explosive with metal nitrates.



Page: 4
DATE PREPARED: 11/22/1999
MSDS No: L001
Citric Acid Crystal

11. TOXICOLOGICAL INFORMATION

ACUTE

Eyes: Severe irritant. Causes pain and redness. Prolonged or repeated contact may cause mild burn.

Skin: Irritant. May cause pain, redness, dermatitis. Not likely to be absorbed in toxic amounts.

Ingestion: No effect expected. Swallowing large amounts may cause illness.

Inhalation: Irritant. May cause pain and coughing.

TARGET ORGANS:

Skin

GENERAL COMMENTS:

Carcinogens: Not listed by IARC, USA NTP, or USA OSHA.

COMMENTS:

Only selected Registry of Toxic Effects of Chemical Substances (RTECS) data is presented in this document. See the actual entry in RTECS for complete information.

RTECS Number: GE730 000

LC₅₀ = 11.7 g/kg on rats (for anhydrous citric acid)

12. ECOLOGICAL INFORMATION

GENERAL COMMENTS:

Degradability: Biodegradable.

Fish Toxicity: LC₅₀ (P. promelas) = 150 ppm

COMMENTS:

BOD = 0.48 p/p; COD = 0.70 p/p (68% degradation in 5 days)

13. DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL:

Dispose of in accordance with ALL applicable federal, state and local regulations.

EMPTY CONTAINER:

Send empty bags to sanitary landfill. Render other types of containers unusable by puncturing or crushing and sanitary landfill unless prohibited by local regulations.

RCRA/USEPA WASTE INFORMATION:

This material is not a RCRA regulated material.



Page: 5

DATE PREPARED: 11/22/1999

MSDS No: L001

Citric Acid Crystal

COMMENTS:

Always follow ALL applicable federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

Proper Shipping Name: Citric Acid, Anhydrous - Nonregulated

Reportable Quantity (RQ) Under CERCLA: None

Placards: None

Label: None

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

Fire: No Pressure Generating: No Reactivity: No Acute: Yes Chronic: No

Title III Notes: This product contains no substances which are defined as toxic chemicals under the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (40 CFR Part 372).

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA Status: All components of this material are on the TSCA inventory.

STATE REGULATIONS

PROPOSITION 65 STATEMENT:

This product does not contain any substance(s) which are defined by the state of California to cause cancer, birth defects, or other reproductive effects.

16. OTHER INFORMATION

REASON FOR ISSUE:

Biannual review

Approved by: Charles M Maddin, PhD, FAIC

Approval date: 11/22/1999



Page: 6
DATE PREPARED: 11/22/1999
MSDS No: L001
Citric Acid Crystal

REVISION SUMMARY

Revision #: 5

This MSDS replaces the October 05, 1999 MSDS. Any changes in information are as follows:

In Section 1

Date Prepared Section 1 Footnotes

In Section 9

(pH) (from) (pH) Comments

In Section 15

TSCA Status

NFPA CODES

Fire: 1 Health: 1 Reactivity: 0

HMIS CODES

Fire: 1 Health: 1 Reactivity: 0

MANUFACTURER DISCLAIMER:

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The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem Industrial Services, Inc. regarding the accuracy or completeness of the information.

HydroChem Industrial Services, Inc. shall not be held liable for any damage resulting from the handling, or from contact with the above product.

MATERIAL SAFETY DATA SHEET



Page: 1
DATE PREPARED: 12/22/2000
MSDS No: M002
Caustic Soda, flake or bead

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: Caustic Soda, flake or bead
Product Code: M002
Product Name: Sodium Hydroxide
Chemical Family: Alkali
Molecular Formula: NaOH
Generic Name: Caustic Soda, Lye Soda, Lye

MANUFACTURER:

HydroChem Industrial Services, Inc.
900 Georgia Ave.
Deer Park, TX 77536
Customer Service: (800) 934-9376

24 HR. EMERGENCY TELEPHONE NUMBERS:

Emergency Contact: HydroChem ER
Emergency Phone: (800) 569-4889

2. COMPOSITION/INFORMATION ON INGREDIENTS

	wt. %	CAS Registry #
Sodium Hydroxide	100	1310-73-2

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

	EXPOSURE LIMITS		
	OSHA PEL	ACGIH TLV	Supplier
Sodium Hydroxide	2 mg/m3	2 mg/m3 - STEL/ceiling	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE:

White powder

IMMEDIATE CONCERNS:

Corrosive.
May react violently with water.
Do not get in eyes, on skin or clothing.

MEDICAL CONDITIONS AGGRAVATED:

Persons with pre-existing skin disorders, eye problems or impaired pulmonary function may be at increased risk from exposure.



Page: 2

DATE PREPARED: 12/22/2000

MSDS No: M002

Caustic Soda, flake or bead

ROUTES OF ENTRY:

Ingestion, inhalation and eye or skin contact.

4. FIRST AID MEASURES

EYES:

Immediately flush eyes with water for 30 minutes while holding eyelids open. Seek medical attention.

SKIN:

Immediately wash with soap and water. Rinse for 30 minutes. See a doctor at once. Destroy contaminated shoes and clothing.

INGESTION:

DO NOT induce vomiting. Drink large quantities of milk (preferred) or water and give milk of magnesia. Take to hospital at once.

INHALATION:

If effects occur, remove to fresh air. See a doctor at once. If breathing has stopped, begin artificial respiration.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: Not Applicable

Flammable Limits: Not applicable

Autoignition Temperature: None

EXTINGUISHING MEDIA:

Use alcohol foam, carbon dioxide, dry chemical or water spray when fighting fires involving this material.

OTHER CONSIDERATIONS:

Large amounts of heat generated when initially diluted with water.

EXPLOSION HAZARDS:

May release hydrogen gas (explosive) when in contact with aluminum and similar metals.

FIRE FIGHTING EQUIPMENT:

As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective clothing to prevent contact with skin and eyes.



Page: 3
DATE PREPARED: 12/22/2000
MSDS No: M002
Caustic Soda, flake or bead

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES:

Scoop into appropriate containers.
Flush residual with plenty of water.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:

Refer to Section 8.

STORAGE:

No special precautions required.
Avoid wetting.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Ventilation - General and local ventilation are required.

PERSONAL PROTECTION

EYES AND FACE:

Chemical goggles required and an eye wash in work area.

RESPIRATORY:

Use NIOSH approved respirator with dust and mist protection.

PROTECTIVE CLOTHING:

Face shield, boots, protective suit and impervious (neoprene) gloves.

OTHER USE PRECAUTIONS:

Safety shower and eye wash in the work area.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Powder
Color: White
pH: 13
Melting Point: 604°F 318°C
Solubility in Water: Soluble
Specific Gravity: 2.13 (water=1)



Page: 4
DATE PREPARED: 12/22/2000
MSDS No: M002
Caustic Soda, flake or bead

COMMENTS:

pH: pH listed above is for a 1% solution

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

HAZARDOUS DECOMPOSITION:
None

INCOMPATIBLE MATERIALS:

Aluminum, magnesium, water, organic materials, acids, copper, organic halogens, zinc, tin, bronze, brass

11. TOXICOLOGICAL INFORMATION

ACUTE

Eyes: Corrosive. Rapidly causes pain, burns, corneal injury. May cause permanent damage and blindness.

Skin: Corrosive. Rapidly causes pain, burns, redness, swelling and damage to tissue. Not likely to be absorbed in toxic amounts.

Ingestion: Corrosive. Causes pain and severe burns to mouth, throat and stomach.

Inhalation: Corrosive. Short exposure can injure lungs, throat, mucous membranes and reduce lung capacity. Causes pain, burns, choking, and coughing.

TARGET ORGANS:

Skin, Eyes

GENERAL COMMENTS:

Carcinogens: Not listed by IARC, USA NTP, or USA OSHA.

COMMENTS:

Only selected Registry of Toxic Effects of Chemical Substances (RTECS) data is presented in this document. See the actual entry in RTECS for complete information.

RTECS Number: WB4900000

12. ECOLOGICAL INFORMATION

GENERAL COMMENTS:

Degradability: Not biodegradable.

Fish Toxicity: Low toxicity to fish (when neutralized).



Page: 5
DATE PREPARED: 12/22/2000
MSDS No: M002
Caustic Soda, flake or bead

13. DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL:

Ship via permitted waste hauler to permitted hazardous waste disposal facility for landfilling.

EMPTY CONTAINER:

Send empty bags to sanitary landfill. Render other types of containers unusable by puncturing or crushing and sending to a sanitary landfill unless prohibited by local regulations.

RCRA/USEPA WASTE INFORMATION:

RCRA Hazardous Waste Number: D002 (corrosive), D003 (reactive)

COMMENTS:

Always follow ALL applicable federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

Proper Shipping Name: Sodium Hydroxide, solid
Hazard Class: 8
NA/UN Number: UN1823
Packing Group: II
Reportable Quantity (RQ) Under CERCLA: 1000 lb
Placards: Corrosive
Label: Corrosive - 8

SPECIAL SHIPPING NOTES:

Material is a HAZARDOUS MATERIAL AND HAZARDOUS SUBSTANCE. Add the letters RQ to the beginning of the shipping description if the RQ amount is met or exceeded in a single container.

15. REGULATORY INFORMATION

DOT Label Symbol and Statement of Hazard



DOT Corrosive



Page 6
DATE PREPARED: 12/22/2000
MSDS No: M002
Caustic Soda, flake or bead

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

Fire: No Pressure Generating: No Reactivity: No Acute: Yes Chronic: No

Title III Notes: This product contains no substances which are defined as toxic chemicals under the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (40 CFR Part 372).

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

Reportable Spill Quantity: 1000 lb

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA Status: All components of this material are on the TSCA inventory.

STATE REGULATIONS

PROPOSITION 65 STATEMENT:

This product does not contain any substance(s) which are defined by the state of California to cause cancer, birth defects, or other reproductive effects.

16. OTHER INFORMATION

REASON FOR ISSUE:

Biannual review

Approved by: Charles M Maddin, PhD, FAIC

Approval date: 10/24/2000

REVISION SUMMARY

Revision #: 5

This MSDS replaces the October 19, 2000 MSDS. Any changes in information are as follows:
In Section 12

Ecological Comments

NFPA CODES

Fire: 0 Health: 3 Reactivity: 1

HMIS CODES

Fire: 0 Health: 3 Reactivity: 1 Protection: X



Page: 7
DATE PREPARED: 12/22/2000
MSDS No: M002
Caustic Soda, flake or bead

MANUFACTURER DISCLAIMER:

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The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem Industrial Services, Inc. regarding the accuracy or completeness of the information.

HydroChem Industrial Services, Inc. shall not be held liable for any damage resulting from the handling, or from contact with the above product.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CRUDE OIL**

Revision Date: 05-Jan-2006

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: CRUDE OIL
Synonyms: None
Chemical Family: Organic hydrocarbon
Application: Sample Kit
Manufacturer/Supplier: Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000
Prepared By: Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Benzene	71-43-2	< 1	0.5 ppm	1 ppm
Hydrogen sulfide	7783-06-4	< 1	10 ppm	20 ppm
Aromatic solvent	8002-05-9	60 - 100%	Not applicable	500 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye and skin irritation. May be harmful if swallowed. Potential carcinogen. May be harmful if inhaled. Flammable.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	20 - 72
Flash Point/Range (C):	-6.7 - 22.8
Flash Point Method:	TCC
Autoignition Temperature (F):	590
Autoignition Temperature (C):	310
Flammability Limits in Air - Lower (%):	1.1
Flammability Limits in Air - Upper (%):	6.0

Fire Extinguishing Media Carbon Dioxide, Dry Chemicals, Foam.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Use water spray to cool fire exposed surfaces. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 3, Reactivity 0
HMIS Ratings: Flammability 3, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Organic vapor respirator.
Acid gas respirator.

Hand Protection Nitrile gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Yellow to Green or Black
Odor:	Rotten egg
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	0.78 - 0.97
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	< 100
Boiling Point/Range (C):	< 38
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	-60 - -20
Vapor Pressure @ 20 C (mmHg):	100-500
Vapor Density (Air=1):	3 - 4
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	< 15
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause chemical pneumonia. Excessive inhalation causes headache, dizziness, nausea and incoordination.
Skin Contact	Causes drying of the skin. Prolonged or repeated contact may cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	Skin disorders. Respiratory disorders.
Chronic Effects/Carcinogenicity	Contains petroleum distillates which have been shown to cause skin cancer in laboratory animals.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 4300 mg/kg (Rat)
Dermal Toxicity:	LD50: > 2000 mg/kg (Rabbit)
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	If empty container retains product residues, all label precautions must be observed. Transport with all closures in place. Return for reuse or disposal according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT

Petroleum Crude Oil, 3, UN1267, II, (-6.7 C minimum)
NAERG 128

Canadian TDG

Petroleum Crude Oil, 3, UN1267, II, (-6.7 C minimum)

ADR

UN1267, Petroleum Crude Oil, 3, II

Air Transportation

ICAO/IATA

UN1267, Petroleum Crude Oil, 3, II

Sea Transportation

IMDG

Petroleum Crude Oil, 3, UN1267, II, (-6.7 C minimum)

EmS F-E, S-E

Other Shipping Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Ignitability D001
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	B2 Flammable Liquids D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

Cresylic Acid

Material Safety Data Sheet

<u>Section</u>	<u>Title</u>	<u>Section</u>	<u>Title</u>
1 -	Company and Product Identification	9 -	Physical and Chemical Properties
2 -	Composition, Information on Ingredients	10 -	Stability and Reactivity
3 -	Hazards Identification	11 -	Toxicological Information
4 -	First Aid Measures	12 -	Ecological Information
5 -	Fire Fighting Measures	13 -	Disposal Considerations
6 -	Accidental Release Measures	14 -	Transport Information
7 -	Handling and Storage	15 -	Regulatory Information
8 -	Exposure Controls and Personal Protection	16 -	Other Information

1. Company and Product Identification

Product Name: Cresylic Acid

Supplier: Port Arthur Chemical and Environmental Services, LLC.
2420 South Gulfway
Port Arthur, TX 77640

Emergency Contact: **Matt Bowman 713-826-1329**
CHEMTREC 800-424-9300

2. Composition and Information on Ingredients

Chemical Ingredients (% by wt)

<u>INGREDIENTS</u>	<u>WT.PERCENT</u>	<u>CAS #</u>
Phenol	30-46	108- 95-2
o-Cresol	10-16	95-48-7
m-Cresol	10-20	108-39-4
p-Cresol	8-10	106-44-5
2,3-Xylenol	0-0.3	526-75-0
2,4-Xylenol	0-0.8	105-67-9
2,5-Xylenol	0-0.9	95-87-4
3,4-Xylenol	0-1.0	95-65-8
3,5-Xylenol	0-1.8	108-68-9
o-Ethylphenol	0-0.2	90-00-6
m-Ethylphenol	0-2.3	620-17-7
p-Ethylphenol	0-1.0	123-07-9
Tar Acids, C 3-4 Alkylphenol Fraction	1-10	143400-08-4

(See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications)

3. Hazards Identification

Cresylic Acid

Material Safety Data Sheet

Emergency Overview:

Appearance: Clear to Amber Liquid

Odor: Antiseptic

Precautions: DANGER! CAUSES SEVERE BURNS. COMBUSTIBLE LIQUID
Harmful if inhaled. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling.

Environmental Precautions: Prevent further leakage or spillage if safe to do so. Do not contaminate any lakes, streams, ponds, groundwater or soil. Low to moderate aquatic toxicity. Product is expected to undergo biodegradation at the levels anticipated in the environment.

Potential Health Effects:

Eyes: Contact can cause severe irritation and burns of the eyes with possible permanent damage.

Skin: Acute dermal irritation/corrosion. Causes severe burns which may not be immediately painful or visible. Repeated or prolonged contact can cause redness, irritation and scaling of the skin (dermatitis). Liver and kidney injuries may occur.

Inhalation: May cause respiratory tract irritation. May cause headache and dizziness.

Ingestion: Harmful or fatal if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Rapid heartbeat, systolic hypotension, respiratory failure myocardial failure, and pulmonary edema.

Target Organs: Lungs, Kidney, Liver, Central Nervous System, Heart, Pancreas, Spleen.

Additional Advice: Rapid absorption and severe systemic toxicity can occur after any route of exposure.

(See Section 11 for Toxicological Information)

4. First Aid Measures

General Recommendations

Eye Contact: Danger of very serious irreversible effects. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Obtain medical attention.

Skin Contact: Take off contaminated clothing and shoes immediately. If possible, quickly blot material from skin to avoid spreading it. Rapid skin decontamination is critical. Wash off immediately with plenty of water. Wash off with polyethylene glycol and afterwards with

4. First Aid Measures (continued)

Cresylic Acid

Material Safety Data Sheet

plenty of water. Apply PEG/EtOH solution liberally to affected area. Allow to remain 15 to 30 seconds, then wash with water. Continue cycle of water – PEG/EtOH solution for at least 15 minutes (PEG/EtOH solution consists of 2 parts polyethylene glycol 400 to 1 part ethanol. For external use only). Wash off with soap and water. Obtain medical attention. Wash contaminated clothing before re-use.

Inhalation: Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. If breathing is difficult, give oxygen. Keep patient warm and at rest. Obtain medical attention.

Ingestion: If accidentally swallowed obtain immediate medical attention. Immediately give plenty of water (if possible charcoal slurry). Do NOT induce vomiting.

Additional Advice: There is no specific antidote. Treatment consists of support of respiratory and cardiovascular functions.

5. Fire Fighting Measures

Flammable Properties

Flash Point: 84 – 86 °C and 183 – 187 °F

Auto-ignition Temperature: Estimated 559 °C and 1,038 °F

Flammable Limits In Air % By Volume: Lower Explosion Limit – 1.5%(V)
Upper Explosion Limit – 8.6%(V)

Fire and Explosion: Fire or intense heat may cause violent rupture of packages. Material will burn in a fire.

Extinguishing Media: Water spray or fog, foam, dry chemical, CO₂. Do NOT use water jet.

Fire Fighting Instructions: Wear self-contained breathing apparatus and protective suit.

Further Information: Evacuate personnel to safe areas. Stop source of fuel if possible. Keep containers and surroundings cool with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Avoid contact with runoff water. Potential hazard exists from Cresylic Acid vapors carried down wind.

6. Accidental Release Measures

Steps to be Taken in Case of Spill or Leak: Evacuate the area and eliminate all sources of ignition. Only properly trained personnel should respond to spills or leaks. Use personal protective equipment. **Land Spill:** Contain spilled liquid with sand, absorbent material, or concrete dikes for recovery or disposal. Do not flush into surface water or sanitary sewer system. Soak up with inert absorbent material and dispose of as hazardous waste.

Water Spill: Contain spill with booms. Remove material that settles in deeper areas of

6. Accidental Release Measures (continued)

Cresylic Acid

Material Safety Data Sheet

waterway. Cresylic Acids tend to sink in fresh water and float in concentrated brine. Non-disposable equipment should be thoroughly decontaminated with soap and water. Prevent further leakage or spillage if safe to do so. Do not contaminate any lakes, streams, ponds, groundwater or soil.

Spill Precautions: Do not contaminate any lakes, streams, ponds, groundwater or soil.

Reporting Requirements: Composition and extent of any spill should be evaluated against local regulations and reported to the proper agencies, if necessary.

7. Handling and Storage

Safe Handling Advice: Use only in well-ventilated areas. Use only in an area equipped with a safety shower. Handle and open container with care. Do not use pressure to empty drums. Heat only in areas with appropriate exhaust ventilation. Drums should be vented during melting and unloading. Transfer lines and vents should be heated when working with freezable material to avoid pressure differences due to blockages. Vapors should be routed through an appropriate scrubber or flare to avoid release to the atmosphere. Avoid overheating as it may lead to excessive vapors, discoloration, and spillage caused by thermal expansion.

Storage and Handling Materials: **Suitable:** TANKS: Carbon Steel – Stainless Steel
Unsuitable: Avoid use of Aluminum, Copper or Brass Alloys in storage or process equipment which will contact this material.

Shelf Life: Keep container tightly closed in a dry and well-ventilated place. Keep away from food, drink and animal feeding stuffs. Keep away from sources of ignition – No smoking, inert gas blanket and breathing system needed to maintain color stability.

Further Information on Storage Conditions: Corrosive. Hygroscopic. May exhibit super-cooling and crystallize rapidly when seeded or subjected to physical shock.

8. Exposure Controls and Personal Protection

Engineering Measures: Provide adequate ventilation. Mechanical ventilation may be necessary if working with this product in enclosed areas and/or at elevated temperatures. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Personal Protective Equipment:

Eyes: When contact with liquid is possible, use a face shield and/or chemical splash goggles. Otherwise use safety glasses with side shields or goggles.

Skin: Full protective clothing, chemical boots, and chemical gloves. Heavy PVC or butyl-viton gloves are recommended. Non-disposable equipment should be thoroughly decontaminated with soap and water.

8. Exposure Controls and Personal Protection (continued)

Cresylic Acid

Material Safety Data Sheet

Inhalation: NIOSH-approved organic vapor air-purifying respirator, self-contained breathing apparatus, or air-supplied respirators where there may be potential for overexposure.

<u>Exposure Guidelines:</u>	<u>Components</u>	<u>Exposure Limit(s)</u>
	Phenol	OSHA PEL 5 ppm ACGIH TLV (8-hour) 5 ppm
	o-Cresol	OSHA PEL 5 ppm ACGIH TLV (8-hour) 5 ppm
	m-Cresol	OSHA PEL 5 ppm ACGIH TLV (8-hour) 5 ppm
	p-Cresol	OSHA PEL 5 ppm ACGIH TLV (8-hour) 5 ppm
	Naphthalene	OSHA PEL 10 ppm ACGIH TLV (8-hour) 10 ppm ACGIH STEL 15 ppm

PEL = Permissible Exposure Limits	TWA = Time Weighted Average (6 hr)
TLV = Threshold Limit Value	STEL = Short Term Exposure Limit (15 min)
EL = Excursion Limit	WEEL = Workplace Environmental Exposure Level

9. Physical and Chemical Properties

Appearance: Liquid

Color: Clear to Amber

Odor: Antiseptic

Form: Liquid

Boiling Point - Range: 185 – 230 °C and 365 – 446 °F

Vapor Pressure: 0.2 mm Hg @ 25 °C

Vapor Density: Approximately 4

Solubility (water): Approximately 20 g/l @ 25 °C

Viscosity, Dynamic: 4 mPa.s @ 50 °C

Melting Point – Range: < -20 °C and < -4 °C

Density: 1.04 g/cm³ @ 15.5 °C

pH: 5.5

LogKow: 2

10. Stability and Reactivity

Cresylic Acid

Material Safety Data Sheet

Conditions to Avoid: Stable under normal conditions.

Hazardous Decomposition Products: Combustion products include carbon dioxide, carbon monoxide and possibly other unidentified organic compounds.

Incompatibility with Other Materials: Strong oxidizing agents.

Hazardous Polymerization: Does not occur.

11. Toxicological Information

Additional Remarks: Phenol - Absorption through skin causes massive intravascular hemolysis, rapid heartbeat, respiratory depression, kidney injury, liver damage and death. Chronic absorption via any route may result in bluish or brownish discoloration of the tendons (carbolochronosis).

Eyes: Phenol – Corrosive to eyes.
p-Ethylphenol – Severely irritating to corrosive.

Skin: Phenol – Acute Dermal LD50 (rabbit): 850 – 1,400 mg/kg
o-Cresol – Acute Dermal LD50 (rodent): 620 mg/kg
m-Cresol – Acute Dermal LD50 (rabbit): 1,100 – 2,830 mg/kg
p-Cresol – Acute Dermal LD50 (rabbit): 300 mg/kg and (rat): 750 mg/kg

2,4-Xylenol – Acute Dermal LD50 (rodent): 1,040 mg/kg
2,6-Xylenol – Corrosive. Acute Dermal LD50 (rabbit) 1,000 mg/kg
p-Ethylphenol – Mild Skin Irritation. Acute Dermal LD50 (rabbit): >5,000 mg/kg

Inhalation: Phenol – Acute LC50 (rat): 0.31 mg/l
Repeated inhalation at high concentrations may cause damage to lung, heart, liver and kidneys, sensitivity to light and death.

o-Cresol – Repeated inhalation exposure has resulted in central nervous system effects and blood changes.

Ingestion: Phenol – Acute Oral LD50 (rat): 530 mg/kg.
If swallowed can cause death.

o-Cresol – Acute Oral LD50 (rat): 121 – 1,350 mg/kg
Repeat high level oral exposure of rats in mice produced changes in liver and kidney weights, estrus cycles, bone marrow and female reproductive organs, as well as, irritation of the respiratory and gastrointestinal tracts.

m-Cresol – Acute Oral LD50 (rodent): 242 – 828 mg/kg
p-Cresol – Acute Oral LD50 (rat): 207 – 1,800 mg/kg

11. Toxicological Information (continued)

Cresylic Acid

Material Safety Data Sheet

Ingestion: 2,4-Xylenol – Acute Oral LD50 (rodent): 809 – 2,300 mg/kg
2,5-Xylenol – Acute Oral LD50 (rodent): 383 – 938 mg/kg
2,6-Xylenol – Acute Oral LD50 (rodent): 296 – 700 mg/kg
3,4-Xylenol – Acute Oral LD50 (rodent): 400 – 800 mg/kg
3,5-Xylenol – Acute Oral LD50 (rodent): 156 – 1,313 mg/kg

p-Ethylphenol – Acute Oral LD50 (rat): >5,000 mg/kg

Carcinogenicity: Phenol – This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

o-Cresol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

p-Cresol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

Carcinogenicity (continued):

2,3-Xylenol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

2,4-Xylenol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

2,5-Xylenol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

3,4-Xylenol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

3,5-Xylenol – This substance is reported to have tumor promoting activity in mice following skin application. The human health significance of this finding is uncertain. This chemical is not listed for carcinogenicity by IARC, NTP or OSHA.

Cresylic Acid

Material Safety Data Sheet

12. Ecological Information

Aquatic Toxicity – Low to Moderate Aquatic Toxicity:

Phenol – LC50 (fish): 96 hours 5.7 – 56 mg/l
LC50 (daphnia magna): 21 – 100 mg/l

o-Cresol – LC50 (fish): 96 hours 6.2 – 23.3 mg/l
LC50 (daphnia): 48 hours 5 – 21 mg/l
EC50 (algae): 96 hours 40 – 100 mg/l

m-Cresol – EC50 (fish): 96 hours > 30 mg/l
LC50 (fish): 96 hours 7 – 55 mg/l
LC50 (daphnia): 48 hours > 99.5 mg/l
EC50 (algae): 72 hours 125 mg/l

12. Ecological Information (continued)

Aquatic Toxicity – Low to Moderate Aquatic Toxicity (continued):

p-Cresol – EC50 (fish): 96 hours 5 – 16.5 mg/l
LC50 (fish): 96 hours 4.4 – 55.5 mg/l

EC50 (Daphnia Pulicaria): 48 hours 22.7 mg/l
LC50 (Daphnia Magna): 48 hours 1.4 mg/l

LC50 (algae): 72 hours 100 – 250 mg/l
EC50 (Protozoa): 48 hours 157 mg/l
NOEC (P Promelas – Fathead Minnow): 32 d 1.35 mg/l
NOEC (Daphnia Magna): 21 d 1 mg/l
NOEC (aquatic worm): 80 d 1 mg/l

2,3-Xylenol – LC50 (Daphnia): 48 hours 16 mg/l
2,4-Xylenol – LC50 (Fish): 96 hours 7.7 – 17 mg/l
2,5-Xylenol – LC50 (Trout): 96 hours 3.2 – 5.6 mg/l
LC50 (Daphnia): 48 hours 10 mg/l
2,6-Xylenol – LC50 (P Promelas – Fathead Minnow): 96 hours 27 mg/l
LC50 (Daphnia Magna) 48 hours 11.2 mg/l

3,4-Xylenol – LC50 (P Promelas (Fathead Minnow): 96 hours 14 mg/l

Biodegradation: Product is expected to undergo biodegradation at the levels anticipated in the environment.

13. Disposal Considerations

Disposal Methods: Dispose of only in accordance with local, state, and federal regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.

Cresylic Acid

Material Safety Data Sheet

Empty Containers: Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSUREIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, triple-rinsed, properly bunged and promptly returned to a drum reconditioned, or properly disposed.

14. Transportation Information

DOT: Cresylic Acid – 6.1 (8) UN 2022, II

IATA: Cresylic Acid – 6.1 (8) UN 2022, II

IMDG: Cresylic Acid – 6.1 (8) UN 2022, II

15. Regulatory Information

U.S. Federal Regulations

OSHA Classification: Toxic, Corrosive, Combustible Liquid

15. Regulatory Information

<u>TSCA Inventory List:</u>	<u>Components</u>	<u>CAS No.</u>
	Phenol	108-95-2
	Phenol, 2-methyl	95-48-7
	Phenol, 3-methyl	108-39-4
	Phenol, 4-methyl	106-44-5
	Phenol, 2,3-dimethyl	526-75-0
	Phenol, 2,4-dimethyl	105-67-9
	Phenol 2,5-dimethyl	95-87-4
	Phenol 2,6-dimethyl	576-26-1
	Phenol 3,4-dimethyl	95-65-8
	Phenol 3,5-dimethyl	108-68-9
	Phenol, 2-ethyl	90-00-6
	Phenol, 3-ethyl	620-17-7
	Phenol, 4-ethyl	123-07-9
	Phenol, trimethyl	26998-80-1

SARA 302 Status: Contains no chemicals subject to SARA 302 reporting.

SARA 311/312 Classification: "Immediate (acute) health hazard" "Fire Hazard"

<u>SARA 313 Chemical(s):</u>	<u>Components</u>	<u>CAS No.</u>	<u>Weight %</u>
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Cresylic Acid

Material Safety Data Sheet

Phenol	108-95-2	30
Phenol 2-methyl	95-48-7	30
Phenol 3-methyl	108-39-4	30
Phenol 4-methyl	106-44-5	30
Phenol 2,4-dimethyl	105-67-9	10
Naphthalene	91-203	0

CERCLA

<u>Hazardous Substance:</u>	<u>Components</u>	<u>CERCLA</u>	<u>Weight %</u>
	Phenol	1,000/lb	30
	Phenol 2-methyl	100/lb	30
	Phenol 3-methyl	100/lb	30
	Phenol 4-methyl	100/lb	30
	Phenol 2,4-dimethyl	100/lb	10
	Naphthalene	100/lb	0

15. Regulatory Information (continued)

International Regulations:

Workplace Hazardous Materials Information System (WHMIS) Classification

Combustible Liquid
Very Toxic Material Immediate and Serious Toxic Effects
Very Toxic Material Causing Other Toxic Effects
Corrosive Material

Australian Inventory of Chemical Substances (AICS) Listing

Listed on the AICS

Japanese Minister of International Trade and Industry (MITI) Inventory Listing

Listed on the MITI.

Canadian Domestic Substance List (DSL) Inventory Listing

Listed on the DSL.

European Inventory of Existing Commercial Chemical Substances (EINECS) Listing

Listed on the EINECS

Philippines Inventory List (PICCS)

Cresylic Acid

Material Safety Data Sheet

Not listed on the PICCS

Korean Inventory List (ECL)

Not listed on the ECL

China Inventory List (CIL)

Listed on the CIL

16. Other Information

<u>Hazard Ratings:</u>	<u>Health</u>	<u>Flammability</u>	<u>Reactivity</u>
NFPA	3	2	0

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND OSHA, ANSI, NFPA, DOT, ERG AND CHRIS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE THE MATERIAL SAFETY DATA SHEET PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

Cresylic Acid

Material Safety Data Sheet





Material Safety Data Sheet

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)
(CAN) CANUTEC : 1(613) 996-6666 (24hrs)
(USA) Anachemia : 1(518) 297-4444
(CAN) Anachemia : 1(514) 489-5711

<p>Toxicity values of the hazardous ingredients</p>	<p>DECYL ALCOHOL: ORAL (LD50): Acute: 4720 mg/kg (Rat). 6500 mg/kg (Mouse). DERMAL (LD50): Acute: 3560 mg/kg (Rabbit). VAPOR (LC50): Acute: 4000 mg/m3 (Mouse) (2 hour(s)). 3000 mg/m3 (Mammal).</p>
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Section III. Physical Data

DECYL ALCOHOL

page 2/4

Physical state and appearance / Odor	Colorless liquid.
pH (1% soln/water)	Not applicable.
Odor threshold	Not available.
Percent volatile	Not available.
Freezing point	7°C
Boiling point	231°C
Specific gravity	0.829 (Water = 1)
Vapor density	5.5 (Air = 1)
Vapor pressure	8.25 mm of Hg (@ 100°C)
Water/oil dist. coeff.	Not available.
Evaporation rate	<0.2 (n-Butyl acetate = 1).
Solubility	Insoluble in cold water.

Section IV. Fire and Explosion Data

Flash point	OPEN CUP: 82°C
Flammable limits	Not available.
Auto-ignition temperature	265°C
Fire degradation products	Oxides of carbon (CO, CO ₂).
Fire extinguishing procedures	Use DRY chemical, carbon dioxide, foam or water spray. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode.
Fire and Explosion Hazards	Combustible liquid. Vapor forms explosive mixture with air. Contact with oxidizers may cause fire and/or explosion. This material may produce a floating fire hazard. Emits toxic fumes under fire conditions.

Section V. Toxicological Properties

Routes of entry	Ingestion and inhalation. Eye contact. Skin contact. Skin absorption.
Effects of Acute Exposure	Harmful by ingestion, inhalation or skin absorption. Severe irritant. Prolonged exposure can cause narcotic effect.
Eye	Causes severe irritation. May cause severe burns and loss of vision. May cause permanent damage. IRRITATION: EYE-RABBIT 83 mg SEVERE.
Skin	Contact with liquid can cause severe irritation or burns. May cause defatting, drying, cracking, redness, itching, and scaling. The amount of tissue damage depends on length of contact.
Inhalation	Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, laryngitis, dyspnea, headache, nausea, and vomiting. Prolonged exposure can cause narcotic effect.
Ingestion	If a small amount of the liquid is aspirated into the lungs, very severe lung damage or death could result. May cause diarrhea, dyspnea, and death. See inhalation.

Section V. Toxicological Properties

DECYL ALCOHOL

page 3/4

Effects of Chronic Overexposure	See acute effects. Carcinogenic effects: Not available. Mutagenic effects: Not available. Teratogenic effects: Not available. Toxicity of the product to the reproductive system: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.
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Section VI. First Aid Measures

Eye contact	Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention.
Skin contact	Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reusing.
Inhalation	Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Call a physician.
Ingestion	If conscious, wash out mouth with water. Never give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention. Guard against aspiration into lungs.

Section VII. Reactivity Data

Stability	Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination.
Hazardous decomp. products	Not available.
Incompatibility	Oxidizing agents, acids, acid anhydrides, acid chlorides, halogens, acetaldehyde, ethylene oxide, hexamethylene diisocyanate, hydrogen peroxide, sulfuric acid, hypochlorous acid, diisocyanates, isocyanates, lithium aluminum hydride, nitrogen tetroxide, perchloric acid, barium perchlorate, diethyl aluminum bromide, tri-isobutyl aluminum, aldehydes, monomers, polymerizable esters, alkylene oxides.
Reaction Products	Not available. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

DECYL ALCOHOL

page 4/4

Protective Clothing in case of spill and leak Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.

Spill and leak Evacuate the area. Eliminate all sources of ignition. Absorb on sand or vermiculite and place in a closed container for disposal. Use non-sparking tools. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch spilled material.

Waste disposal Burn in a chemical incinerator equipped with an after burner and scrubber. According to all applicable regulations.

Storage and Handling Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Take precautionary measures against electrostatic discharges. Ground the container while dispensing. Ground all equipment containing material. Use only explosion proof equipment. Use non-sparking tools. Watch for accumulation in low confined areas. Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.).

Section IX. Protective Measures

Protective clothing Splash goggles. Impervious rubber gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. Have available and use as appropriate: face shields, rubber suits, aprons, and boots. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

Engineering controls Use only in a chemical fume hood. Use adequate ventilation. Do not use in unventilated spaces.

Section X. Other Information

Special Precautions or comments Toxic! Combustible liquid! Severe irritant! May cause burns. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use only in a chemical fume hood. Keep away from heat, sparks and flame. Handle and open container with care. Container should be opened only by a technically qualified person.
RTECS NO: HE4375000 (Decyl alcohol).



NFPA

Prepared by MSDS Department/Département de F.S..

Validated 20-Oct-2004

) Telephone# (514) 489-5711

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

5501 Baker Road Baytown, Texas 77520
P O Box 1516 Baytown, Texas 77522
Telephone : 281/424-4505 Fax: 281/424-3532



MATERIAL SAFETY DATA SHEET

Decahydronaphthalene (DHN)

PRODUCT IDENTIFICATION

Chemical Name: Decahydronaphthalene

Chemical Family: Aromatic hydrocarbon, C₁₀H₁₈

Trade Name: DHN

Synonyms: Decalin

Revision Date: 04/16/03

Manufacturer /Distributor: Advanced Aromatics, L.P. 5501 Baker Road Baytown, TX 77520

EMERGENCY CONTACT: (281) 424-4505 24 hour number: (281) 424-9566 Chemtree: (800) 424-9300

HAZARDOUS COMPONENTS

The following chemical components have been determined to be hazardous under OSHA's Hazard Communication Std. 29 CFR 1910.1200, and are listed in Table Z-1, Z-2, and/or Z-3 1910.1000 (Toxic and Hazardous Substances).

CAS No.	Material or Component	Percentage
91-17-8	Decahydronaphthalene, mixture of Cis and Trans	95 - 99%
119-64-2	1,2,3,4-Tetrahydronaphthalene	< 1 %

PHYSICAL DATA (TYPICAL)

Specific Gravity (Water = 1): 0.8927 - 0.87 @ 68 °F	Boiling Point: 368 °F
Vapor Density (Air = 1): 4.55	Freezing Point: -46 °F
Vapor Pressure (PSIA): 1.0 mmHg @ 100 °F	Evaporation Rate (Butyl Acetate = 1): < 1
Solubility In Water: insoluble in water, soluble in alcohol and ether	Viscosity: 1.348 cp @ 68 °F

Physical Description: clear colorless liquid with an aromatic odor.

FIRE AND EXPLOSION DATA

Flash Point: 136 °F Autoignition Temperature : 482 °F

Flammable Limits in Air % by Volume: Lower: 0.7 Upper: 4.9

Extinguishing Media: Use dry chemical, carbon dioxide, water spray and foam suitable for hydrocarbon use.

Special Fire Fighting Procedures: Flammable and toxic vapors given off in a fire. Wear complete personal protection equipment. SCBA required. Keep area controlled to prevent exposures to people downwind.

Unusual Fire and Explosion Hazard: explosive air mixtures are created in a fire situation

T.N. # 1084
Detergent A
HOT Wash
Cold Rinse
Dry, Dry
ASAP

REACTIVITY DATA

Stability: Product is stable under normal storage conditions, however; prolonged exposure to oxygen can cause Hydroperoxide formation.

Conditions to Avoid: Extreme heat, sources of ignition, strong oxidizers, and long-term storage with oxygen in the vapor space.

Incompatibility: Strong Oxidizers.

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products When Heated: Flammable vapors are emitted creating carbon dioxide and toxic fumes of carbon monoxide.

HMIS RATING

NFPA 704 Rating: 0 - Insignificant 1 - Slight 2 - Moderate 3 - High 4 - Extreme

Health: 2 Flammability: 2 Reactivity: 0 Special Hazard: None Personal Protection: B

HEALTH HAZARD INFORMATION

Symptoms Of Exposure:

Symptoms of exposure to this product may include irritation to the skin, eyes, mucous membranes and respiratory tract, dizziness, narcosis, suffocation, lower blood pressure, CNS depression, nausea and headache. Prolonged skin contact may result in dermatitis. Eye contact may result in temporary corneal damage.

Health Effects:

ACUTE - Eye, skin, respiratory system, and mucous membrane irritation accompanied by headache and nausea. Liver and kidney damage caused by acute ingestion.

CHRONIC - Permanent damage to the skin, liver, kidneys due to overexposure.

Ingestion: Do not take internally. Seek physician advice immediately.

Skin: Avoid prolonged or repeated skin contact.

Inhalation: Avoid inhalation of vapors. Use in well ventilated areas.

Eyes: Avoid chemical contact with the eyes.

Special Medical Conditions Aggravated by Exposure: None known.

Primary Route of Entry: Inhalation of vapors and skin contact.

Exposure Limits: None Established for this product

(Naphthalene) OSHA PEL- 10 ppm (50 mg/m³) TWA for 8-hour workday, STEL = 15 ppm (75 mg/m³).

ACGIH TLV- 10 ppm (52 mg/m³) TWA for 8-hour workday.

Carcinogen Status: Not listed on (NTP) National Toxicology Program Annual Report on Carcinogens or (IARC) International Agency for Research on Cancer " Monographs", and is not classified by OSHA as a carcinogen. .

NTP studies TR-410 and TR-500 show evidence of increased tumor growth in rodents after inhalation of Naphthalene.

Toxicity:

NIOSH REGISTRY NUMBER: QJ3150000

TOXICITY:

Dose	mode	specie	amount / units
Mild Irritant	Draize Test (eye)-	Rabbit	500 mg/24 hr.
Mild Irritant	Draize Test (skin)-	Rabbit	10 mg/24 hr.
LD50	Oral -	Rat	4170 mg/kg

LC50	Inhalation -	Rat	710 ppm/4H
LC50	Inhalation -	mus	1085 ppm/4H
Irritant TCLO	Inhalation -	Human	100 ppm

ARCINOGENICITY:

Tumorigenic Data: No test data available

NTP carcinogenicity studies: No test data available for THN, but Naphthalene is studied in TR-410 and TR-500 by the NTP.

MUTATION DATA:

No test data available

TERATOGENICITY:

No test data available

FIRST AID

Ingestion: Do not induce vomiting. Immediately seek medical attention.

Skin: Remove soiled clothing and wash with soap and water. Seek medical attention if irritation develops or persists.

Inhalation: Remove to fresh air. If breathing irregular, administer oxygen. Immediately seek medical attention.

Eyes: Flush eyes with water for at least 15 minutes. Immediately seek medical attention.

SPILL OR LEAK PROCEDURES / WASTE DISPOSAL

In Case of a Transportation Accident, Contact CHEMTREC at 1-800/424-9300.

IN CASE OF SPILLS OR RELEASE: Refer to DOT NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK for handling information. For small spill, use solid absorbent and shovel into disposal container. For large spills, dike the area to facilitate salvage or disposal. Shut off ignition sources and avoid breathing vapors. Avoid runoff into sewers and advise authorities.

Waste Disposal Method: Adhere to all local, state, and federal regulations. See regulatory information below.

Disposal: If this product becomes a waste, it must be disposed of as required by applicable state and federal laws.

SPECIAL PROTECTION INFORMATION

Respiratory Protection: Organic vapor cartridge respirator with particulate filter, or SCBA.

Gloves: Non-permeable Nitrile rubber with durable construction to match the task.

Eyes: Chemical splash goggles or face shield.

Ventilation: Use local exhaust as required to control exposure. Electrical classification of equipment should be considered.

SPECIAL PRECAUTIONS

Storage and Handling: Product should be stored in closed containers under nitrogen atmosphere and located in a cool dry location, away from source of ignition and oxidizing agents. Avoid breathing vapors and mists, along with prolonged skin contact.

TRANSPORTATION INFORMATION

proper shipping name / hazard class may vary by packaging, properties, and mode of transportation.

proper shipping names are:

ALL TRANSPORTATION MODES: Decahydronaphthalene

AIR TRANSPORTATION: Decahydronaphthalene
(IATA / ICAO)

MARINE TRANSPORTATION: Decahydronaphthalene
(IMDG / IMO)

UN/ID NO.: UN1147

HAZARD CLASS - PRIMARY: 3 (Flammable Liquid)

PACKING GROUP: III

CARGO AIRCRAFT LIMIT: 220 L

PASSENGER AIRCRAFT LIMIT: 60 L

FLASH POINT: 136 °F

TECHNICAL NAME(s): Decahydronaphthalene, 1,2,3,4-Tetrahydronaphthalene

RQ LBS. (Per pkg.): N/A

RQ COMPONENTS (s): None

MARINE POLLUTANT (s): None

REGULATORY INFORMATION RIGHT-TO-KNOW PROGRAM

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR472.

CAS No.	Material or Component	% by Weight
91-17-8	Decahydronaphthalene, mixture of Cis and Trans	95 - 99%
119-64-2	1,2,3,4-Tetrahydronaphthalene	< 1 %

THE FOLLOWING FEDERAL REGULATIONS APPLY TO THIS PRODUCT:

OSHA HAZARD COMMUNICATION STD: 29CFR 1910.1200, 29 CFR 1910.1000 Table Z-1, Z-2, and/or Z-3.

None established for Decahydronaphthalene

Based on a hazard evaluation, the following components in this product are hazardous for the reasons listed below.

- Immediate (acute) health hazard
- Delayed (chronic) health hazard
- xx--Fire Hazard
- Sudden release of pressure hazard
- Reactive hazard

ERCLA, 40 CFR 117,302:

This product contains no reportable quantity (RQ) substances, requiring reporting to the National Response Center, Washington D.C. (1-800-424-8802). There may also be other state and local requirements to report spills.

SARA TITLE III:

Section 302 - This product does not contain any components regulated under SARA TITLE III, Section 302 (Extremely Hazardous Substance).

TOXIC SUBSTANCE CONTROL ACT (TSCA): The component(s) in this product are on the TSCA Inventory.

***ALL INFORMATION ON THIS MSDS MUST BE INCLUDED IN ALL MSDS THAT ARE
COPIED AND DISTRIBUTED FOR THIS MATERIAL.***

This information is provided for the customers of Advanced Aromatics; however, it does not address in detail the use, storage or handling of the product. Users of the product, considering their use, storage or handling of the product, may need to develop additional procedures.

The information should not be relied on to insure compliance by the customer with any federal, state or local legal requirements.

Information provided herein, are not product specifications.

Method of control: None
PRODUCT:

[illegible]

Note: Water is not a regulated pollutant.

2/27/2008

(MSDS #830555 - RTF Format)

MATERIAL SAFETY DATA SHEET

SHELL MSDS: 830555-1 10/06/00

DEMINERALIZED WATER

TELEPHONE NUMBER:

24 HOUR EMERGENCY ASSISTANCE
CHEMTREC: 800-424-9300

GENERAL MSDS ASSISTANCE
SHELL: 713-241-4819

COMPANY NAME AND ADDRESS

SHELL CHEMICAL COMPANY
P.O. BOX 4320
HOUSTON, TX 77210-4320 USA

SECTION I NAME

PRODUCT: DEMINERALIZED WATER
CHEM NAME: --
CHEM FAMILY: NONE
SHELL CODE: SSSSS

HEALTH HAZARD: 3 FIRE HAZARD: 0 REACTIVITY: 0

SECTION II-A INGREDIENTS

NO.	COMPOSITION	CAS NO.	PERCENT
P	DEMINERALIZED WATER	7732-18-5	100
1	WATER	7732-18-5	100

SECTION II-B ACUTE TOXICITY DATA

NO.	ACUTE ORAL LD50	ACUTE DERMAL LD50	ACUTE INHALATION LD50
P	NO DATA AVAILABLE		

SECTION III HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

EYE CONTACT:

MATERIAL IS PRESUMED TO BE NONIRRITATING TO MINIMALLY IRRITATING TO THE EYES. HOT MATERIAL MAY CAUSE THERMAL EYE BURNS.

SKIN CONTACT:

MATERIAL IS PRESUMED TO BE NONIRRITATING TO SLIGHTLY IRRITATING TO THE SKIN. HOT MATERIAL MAY CAUSE THERMAL BURNS.

INHALATION:

http://swww-uschemicalonline.shell.com/USChemicalOnline/doc_view.asp?ViewType=&Vi... 6/19/2007

MATERIAL IS PRESUMED TO HAVE A LOW ORDER OF ACUTE TOXICITY UPON INHALATION OF MIST OR VAPORS. HOT MATERIAL MAY CAUSE THERMAL BURNS.

INGESTION:

MATERIAL IS PRESUMED TO HAVE A LOW ORDER OF ACUTE ORAL TOXICITY. HOT MATERIAL MAY CAUSE THERMAL BURNS.

SIGNS AND SYMPTOMS:

TISSUE DAMAGE AT ALL POINTS OF CONTACT WITH HOT MATERIAL.

AGGRAVATED MEDICAL CONDITIONS:

NONE.

OTHER HEALTH EFFECTS:

SECTION IV OCCUPATIONAL EXPOSURE LIMITS

COMP NO.	OSHA PEL/TWA	OSHA PEL/CEILING	ACGIH TLV/TWA	ACGIH TLV/STEL	OTHER
P	NONE				

SECTION V EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT:

FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN.

SKIN CONTACT:

FLUSH SKIN WITH WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. GET MEDICAL ATTENTION. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED.

INHALATION:

REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION.

INGESTION:

DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION.

NOTE TO PHYSICIAN:

SECTION VI SUPPLEMENTAL HEALTH INFORMATION

NONE IDENTIFIED.

SECTION VII PHYSICAL DATA

BOILING POINT (DEG F): SPECIFIC GRAVITY (H2O = 1): VAPOR PRESSURE (MM HG):

http://swww-uschemicalonline.shell.com/USChemicalOnline/doc_view.asp?ViewType=&Vi... 6/19/2007

212

1.0

NOT APPLICABLE

MELTING POINT (DEG F): SOLUBILITY IN WATER: VAPOR DENSITY (AIR = 1):
NOT APPLICABLE NOT APPLICABLE NOT APPLICABLE

PH: 7.0

EVAPORATION RATE (NORMAL BUTYL ACETATE = 1): NOT APPLICABLE

APPEARANCE AND ODOR:
WATER WHITE; ODORLESS.

SECTION VIII FIRE AND EXPLOSION HAZARDS

FLASH POINT AND METHOD: NOT APPLICABLE

FLAMMABLE LIMITS/PERCENT VOLUME IN AIR: LOWER: N/APP UPPER: N/APP

EXTINGUISHING MEDIA:
NOT APPLICABLE.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:

UNUSUAL FIRE AND EXPLOSION HAZARDS:

SECTION IX REACTIVITY

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID:
AVOID CONTACT WITH STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS:

SECTION X EMPLOYEE PROTECTION

RESPIRATORY PROTECTION:
DO NOT BREATHE STEAM OR MIST.

PROTECTIVE CLOTHING
DO NOT GET IN EYES. WEAR CHEMICAL GOGGLES IF THERE IS POTENTIAL CONTACT WITH EYES. DO NOT GET ON SKIN, ON CLOTHING. WEAR PROTECTIVE CLOTHING SUCH AS GLOVES, OUTER CLOTHING OR APRON, OVERSHOES AND A FACE-SHIELD SUITABLE TO POTENTIAL EXPOSURE.

ADDITIONAL PROTECTIVE MEASURES:

SECTION XI ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES:

*** LARGE SPILLS *** WEAR PROTECTIVE CLOTHING AS APPROPRIATE. SHUT OFF SOURCE OF LEAK IF SAFE TO DO SO. DIKE AND CONTAIN. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND OR OTHER SUITABLE MATERIAL; DISPOSE OF PROPERLY. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE. *** SMALL SPILLS *** TAKE UP WITH AN ABSORBENT MATERIAL AND DISPOSE OF PROPERLY.

SECTION XII SPECIAL PRECAUTIONS

THOROUGHLY WASH UP WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING OR USING TOILET FACILITIES.

SECTION XIII TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:

TRANSPORTATION REQUIREMENTS DETERMINED ON A CASE BY CASE BASIS BY SHIPPING LOCATION.

DOT PROPER SHIPPING NAME:

OTHER REQUIREMENTS:

BULK, DRUM AND SAMPLE LABELS FOR THIS MATERIAL ARE AVAILABLE FROM THE COMPUTER LABEL SYSTEM (CLS); USE LABEL CODE 830555. THE CLS LABELS DO NOT MEET ANY D.O.T. REQUIREMENTS. THE SHIPPING LOCATION MUST EVALUATE EACH SHIPMENT AND COMPLY WITH D.O.T. MARKING AND LABEL REQUIREMENTS, AS APPROPRIATE.

SECTION XIV OTHER REGULATORY CONTROLS

THIS PRODUCT IS LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES.

IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE ATTACHED ENVIRONMENTAL DATA SHEET (EDS) SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

SECTION XV STATE REGULATORY INFORMATION

<u>STATE LISTED COMPONENT</u>	<u>CAS NO.</u>	<u>PERCENT</u>	<u>STATE CODE</u>
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BASED ON INFORMATION AVAILABLE TO SHELL, THIS PRODUCT DOES NOT CONTAIN ANY CHEMICAL SUBSTANCE REGULATED BY A SPECIFIC STATE LIST.

SECTION XVI SPECIAL NOTES

http://swwww-uschchemicalonline.shell.com/USChemicalOnline/doc_view.asp?ViewType=&Vi... 6/19/2007

ADDRESS CHANGED.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, SHELL MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

WE ARE PROVIDING OUR MOST RECENT MATERIAL SAFETY DATA SHEET AND/OR ENVIRONMENTAL DATA SHEET. IF YOU WISH TO RECEIVE UPDATES TO THIS INFORMATION, PLEASE CALL SHELL'S GENERAL MSDS ASSISTANCE LINE (713-241-4819) TO ENSURE THAT YOU ARE ADDED TO SHELL'S REGULAR MSDS DISTRIBUTION SYSTEM.

BE SAFE. READ OUR PRODUCT
SAFETY INFORMATION...AND
PASS IT ON. (PRODUCT
LIABILITY LAW REQUIRES IT)

SHELL CHEMICAL COMPANY
P.O. BOX 4320
HOUSTON, TX 77210-4320 USA

ENVIRONMENTAL DATA SHEET

SHELL EDS: 830555-00 10/06/00

DEMINERALIZED WATER

TELEPHONE NUMBER:

24 HOUR EMERGENCY ASSISTANCE
CHEMTREC: 800-424-9300

GENERAL MSDS ASSISTANCE
SHELL: 713-241-4819

COMPANY NAME AND ADDRESS

SHELL CHEMICAL COMPANY
P.O. BOX 4320
HOUSTON, TX 77210-4320 USA

PRODUCT CODE: SSSSS

SECTION I PRODUCT COMPOSITION

NO.	COMPOSITION	CAS	PERCENT
P	DEMINERALIZED WATER	7732-18-5	100
1	WATER	7732-18-5	100

SECTION II SARA TITLE III INFORMATION

NO.	EHS RQ	EHS TPQ	SEC-313	313 CATEGORY	311/312 CATEGORY
	(*1)	(*2)	(*3)	(*4)	(*5)

P

H-1

http://sww-uschemicalonline.shell.com/USChemicalOnline/doc_view.asp?ViewType=&Vi... 6/19/2007

EPAPA005000815

-
- *1 = REPORTABLE QUANTITY OF EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
 - *2 = THRESHOLD PLANNING QUANTITY, EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
 - *3 = TOXIC CHEMICAL, SEC 313
 - *4 = CATEGORY AS REQUIRED BY SEC 313 (40 CFR 372.65 C), MUST BE USED ON TOXIC RELEASE INVENTORY FORM
 - *5 = CATEGORY (FOR AGGREGATE REPORTING REQUIREMENTS UNDER SARA 311, 312)
 - HEALTH: H-1 = IMMEDIATE (ACUTE) HEALTH HAZARD
 - H-2 = DELAYED (CHRONIC) HEALTH HAZARD
 - PHYSICAL: P-3 = FIRE HAZARD
 - P-4 = SUDDEN RELEASE OF PRESSURE HAZARD
 - P-5 = REACTIVE HAZARD

SECTION III ENVIRONMENTAL RELEASE INFORMATION

NOT APPLICABLE

SECTION IV RCRA INFORMATION

PLACE IN AN APPROPRIATE DISPOSAL FACILITY IN COMPLIANCE WITH LOCAL REGULATIONS.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **DETERGENT**

Revision Date: 06-Jan-2005

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: DETERGENT
Synonyms: None
Chemical Family: Anionic and Nonionic Surfactant
Application: Anionic Surfactant
Manufacturer/Supplier: Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000
Prepared By: Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye and skin irritation.

4. FIRST AID MEASURES

Inhalation: If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin: Wash with soap and water.
Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion: Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician: Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	> 210
Flash Point/Range (C):	> 99
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 0, Reactivity 0

HMS Ratings: Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.

Storage Information Keep container closed when not in use. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Organic vapor respirator.

Hand Protection Impervious rubber gloves.

Skin Protection Normal work coveralls.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Red
Odor:	Pleasant
pH:	9
Specific Gravity @ 20 C (Water=1):	1.01

DETERGENT
Page 2 of 5

Density @ 20 C (lbs./gallon):	8.4
Bulk Density @ 20 C (lbs/ft3):	62.8
Boiling Point/Range (F):	215
Boiling Point/Range (C):	102
Freezing Point/Range (F):	30
Freezing Point/Range (C):	-1.11
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	2.0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Miscible
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	Causes drying of the skin. May cause mild skin irritation.
Eye Contact	May cause mild eye irritation.
Ingestion	May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	If empty container retains product residues, all label precautions must be observed. Transport with all closures in place. Return for reuse or disposal according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

DETERGENT
Page 4 of 5

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
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Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.
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END OF MSDS

DETERGENT
Page 5 of 5

EPAPA005000821

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **DIESEL FUEL**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: DIESEL FUEL
Synonyms: None
Chemical Family: Organic hydrocarbon
Application: Fuel

Manufacturer/Supplier: Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By: Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Diesel	68476-34-6	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. Potential carcinogen. Combustible.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Min: > 150
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Min: > 65
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	495
Flammability Limits in Air - Upper (%):	257
	0.7
	6

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 2, Reactivity 0
HMS Ratings:	Flammability 2, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear colorless

DIESEL FUEL
Page 2 of 6

9. PHYSICAL AND CHEMICAL PROPERTIES

Odor:	Diesel
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	0.84
Density @ 20 C (lbs./gallon):	7.0
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	300
Boiling Point/Range (C):	148
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	1
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	100
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	2.0-5.8
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin defatting with prolonged exposure. May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	Contains petroleum distillates which have been shown to cause skin cancer in laboratory animals.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT

Not restricted except for ADR

DOT (Bulk)

Diesel Fuel, Combustible Liquid, NA1993, III

Canadian TDG

Not restricted except for ADR

ADR

UN1202, Diesel, 3, III

Not restricted except for ADR

Air Transportation

ICAO/IATA

UN1202, Diesel, 3, III

Not restricted except for ADR

Sea Transportation

IMDG

UN1202, Diesel, 3, III

Not restricted except for ADR

Other Shipping Information

Labels: Combustible

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory All components listed on inventory.

EPA SARA Title III Extremely Hazardous Substances Not applicable

EPA SARA (311,312) Hazard Class Acute Health Hazard
Chronic Health Hazard
Fire Hazard

EPA SARA (313) Chemicals This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).

EPA CERCLA/Superfund Reportable Spill Quantity For This Product Not applicable.

EPA RCRA Hazardous Waste Classification If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.

California Proposition 65 All components listed do not apply to the California Proposition 65 Regulation.

MA Right-to-Know Law Does not apply.

NJ Right-to-Know Law Does not apply.

PA Right-to-Know Law Does not apply.

Canadian Regulations

Canadian DSL Inventory All components listed on inventory.

WHMIS Hazard Class B3 Combustible Liquids

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****



Material Safety Data Sheet

The Dow Chemical Company

Product Name: Diethanolamine

Issue Date: 09/15/2006
Print Date: 31 Jul 2007

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
Diethanolamine

COMPANY IDENTIFICATION

The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview

Color: Colorless above freezing point
Physical State: Liquid above freezing point
Odor: Ammoniacal
Hazards of product:

|| **WARNING!** Causes eye irritation. May cause skin irritation. May be harmful if swallowed.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause severe eye irritation. May cause severe corneal injury.
Skin Contact: Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage. May cause more severe response if skin is abraded (scratched or cut). Not classified as corrosive to the skin according to DOT guidelines.
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

* Indicates a Trademark

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. Vapor from heated material may cause respiratory irritation and other effects.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may result in gastrointestinal irritation or ulceration.

Effects of Repeated Exposure: Results from repeated exposure tests on diethanolamine in laboratory animals include anemia (rats) and effects on kidney (rats and mice) and liver (mice). Heart and nervous system effects were also observed in animals given exaggerated doses of diethanolamine. Changes in other organs, causes of which are nonspecific, were judged secondary to the poor health of the animals due to the extremely high doses of diethanolamine given.

Cancer Information: Findings from a chronic diethanolamine skin painting study by NTP include liver and kidney tumors in mice; no tumors were observed in rats. Mechanistic studies indicate that tumor formation is of questionable relevance to humans.

Birth Defects/Developmental Effects: Has been toxic to the fetus in lab animals at doses toxic to the mother.

3. Composition Information

Component	CAS #	Amount
N,N-Diethanolamine	111-42-2	> 99.2 %

4. First-aid measures

Eye Contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Ingestion: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

Notes to Physician: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers,

boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Non-combustible material. Sand. Clay. Vermiculite. Zorb-all®. Collect in suitable and properly labeled containers. Do NOT use absorbent materials such as: Cellulose. Sawdust. Large spills: Contain spilled material if possible. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Refer to Section 7, Handling, for additional precautionary measures. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Avoid contact with eyes. Avoid contact with skin and clothing. Do not swallow. Wash thoroughly after handling. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Store in a dry place. Avoid moisture. Do not store in: Aluminum. Copper. Copper alloys. Avoid freezing.

Storage Period: **Storage temperature:**
34 - 49 °C

Bulk

6 Months

Metal drums.

24 Months

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
N,N-Diethanolamine	ACGIH	TWA	2 mg/m3 SKIN

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

Personal Protection

Eye/Face Protection: Use chemical goggles.

Skin Protection: When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, boots, apron, or full-body suit will depend on the task. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Liquid above freezing point
Color	Colorless above freezing point
Odor	Ammoniacal
Flash Point - Closed Cup	191 °C (376 °F) <i>Pensky-Martens Closed Cup ASTM D 93</i>
Flammable Limits In Air	Lower: 1.5 % (V) <i>Literature</i> Upper: No test data available
Autoignition Temperature	395 °C (743 °F) <i>Literature</i>
Vapor Pressure	< 0.01 mmHg @ 20 °C <i>Literature</i>
Boiling Point (760 mmHg)	268 °C (514 °F) <i>Estimated Decomposes.</i>
Vapor Density (air = 1)	3.6 <i>Literature</i>
Specific Gravity (H ₂ O = 1)	1.092 30 °C/20 °C <i>Literature</i>
Freezing Point	28.0 °C (82.4 °F) <i>Literature</i>
Melting Point	Not applicable to liquids
Solubility in Water (by weight)	100 % @ 20 °C <i>Literature</i>
pH	11.5 (10% aqueous solution)
Octanol/Water Partition Coefficient	-2.18 <i>Shake flask (OECD 107 Test)</i>
Dynamic Viscosity	380 cps @ 30 °C <i>Literature</i>
Kinematic Viscosity	No test data available

10. Stability and Reactivity

Stability/Instability

Stable under recommended storage conditions. See Storage, Section 7. Hygroscopic.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose.

Generation of gas during decomposition can cause pressure in closed systems. Avoid moisture.

Incompatible Materials: Avoid contact with: Nitrites. Strong acids. Strong oxidizers. Product may potentially react with various halogenated organic solvents, resulting in temperature and/or pressure increases. Corrosive when wet. Heating above 60°C in the presence of aluminum can result in corrosion and generation of flammable hydrogen gas. Avoid unintended contact with: Halogenated hydrocarbons.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information**Acute Toxicity****Ingestion**

LD50, Rat, female 680 - 1,100 mg/kg

Skin Absorption

LD50, Rabbit > 8,200 mg/kg

Repeated Dose Toxicity

Results from repeated exposure tests on diethanolamine in laboratory animals include anemia (rats) and effects on kidney (rats and mice) and liver (mice). Heart and nervous system effects were also observed in animals given exaggerated doses of diethanolamine. Changes in other organs, causes of which are nonspecific, were judged secondary to the poor health of the animals due to the extremely high doses of diethanolamine given.

Chronic Toxicity and Carcinogenicity

Findings from a chronic diethanolamine skin painting study by NTP include liver and kidney tumors in mice; no tumors were observed in rats. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. A number of factors may have influenced the results and are being considered in their interpretation.

Developmental Toxicity

Has been toxic to the fetus in lab animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Genetic Toxicology

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information**CHEMICAL FATE****Movement & Partitioning**

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Henry's Law Constant (H): 5.35E-14 atm*m3/mole; 25 °C Measured

Partition coefficient, n-octanol/water (log Pow): -2.18 Shake flask (OECD 107 Test)

Partition coefficient, soil organic carbon/water (Koc): 1 Estimated

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
8.90E-11 cm3/s	0.167 d	Estimated

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
100 %	19 d	OECD 301E Test
94 %	14 d	OECD 302B Test

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
10.3 %	34.7 %	56.3 %	

Chemical Oxygen Demand: 1.33 mg/mg

Theoretical Oxygen Demand: 2.13 mg/mg

ECOTOXICITY

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in most sensitive species tested). May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.

Fish Acute & Prolonged ToxicityLC50, bluegill (*Lepomis macrochirus*), static: 1,850 - 2,100 mg/l**Aquatic Invertebrate Acute Toxicity**LC50, water flea *Daphnia magna*, 48 h: 122 mg/l**Aquatic Plant Toxicity**EC50, green alga *Selenastrum capricornutum*, biomass growth inhibition, 96 h: 3.3 - 3.6 mg/l**Toxicity to Micro-organisms**

EC50, OECD 209 Test; activated sludge, respiration inhibition, 3 h: > 1,000 mg/l

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. Transport Information**DOT Non-Bulk**

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, NOS

Technical Name: CONTAINS DIETHANOLAMINE

Hazard Class: 9 ID Number: UN3082 Packing Group: PG III

DOT Bulk

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, NOS

Technical Name: CONTAINS DIETHANOLAMINE

Hazard Class: 9 ID Number: UN3082 Packing Group: PG III

IMDG

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, NOS

Technical Name: CONTAINS DIETHANOLAMINE

Hazard Class: 9 ID Number: UN3082 Packing Group: PG III

EMS Number: F-A,S-F

Marine pollutant.: No

ICAO/IATA**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.**Technical Name:** CONTAINS DIETHANOLAMINE**Hazard Class:** 9 **ID Number:** UN3082 **Packing Group:** PG III**Additional Information**

Reportable quantity: 101 lb – DIETHANOLAMINE

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information**OSHA Hazard Communication Standard**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
N,N-Diethanolamine	111-42-2	> 99.2 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
N,N-Diethanolamine	111-42-2	> 99.2 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Product Literature

Additional information on this product may be obtained by calling your Dow Chemical Company sales or customer service contact. Ask for a product brochure. Additional information on this and other Dow products may be obtained by visiting our web page at www.dow.com.

Hazard Rating System

NFPA	Health	Fire	Reactivity
	2	1	0

Recommended Uses and Restrictions

Chemical Intermediate.

Revision

Identification Number: 78279 / 1001 / Issue Date 09/15/2006 / Version: 3.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.



The Chemical Company

Safety data sheet

Diethyl ketone

Revision date : 2006/04/10

Version: 1.0

Page: 1/7

(30036696/MDS_GEN_US/EN)

1. Substance/preparation and company identification

Company

BASF CORPORATION
100 Campus Drive
Florham Park, NJ 07932

24 Hour Emergency Response Information

CHEMTREC: (800) 424-9300
BASF HOTLINE: (800) 832-HELP

Molecular formula:

C(5)H(10)O

Chemical family:

ketones

Synonyms:

Diethylketone

2. Composition/information on ingredients

CAS Number

96-22-0

Content (W/W)

Chemical name

pentan-3-one

3. Hazard identification

Emergency overview

DANGER: FLAMMABLE LIQUID. MAY BE HARMFUL IF SWALLOWED.

MAY BE HARMFUL IF INHALED.

MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION.

INGESTION MAY CAUSE GASTRIC DISTURBANCES.

Avoid contact with the skin, eyes and clothing.

Avoid inhalation of mists/vapours.

Use with local exhaust ventilation.

Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator.

Wear NIOSH-certified chemical goggles.

Wear chemical resistant protective gloves.

Wear protective clothing.

Eye wash fountains and safety showers must be easily accessible.

Potential health effects

Primary routes of exposure

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Irritation:

Irritating to respiratory system. Repeated exposure may cause skin dryness or cracking.

Sensitization:

The substance did not cause skin sensitization in humans.

Medical conditions aggravated by overexposure:

Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product.

See MSDS section 11 - Toxicological information.



The Chemical Company

Safety data sheet

Diethyl ketone

Revision date : 2006/04/10

Version: 1.0

Page: 2/7

(30036696/MDS GEN US/EN)

Potential environmental effects

Aquatic toxicity:

The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

4. First-aid measures

General advice:

Remove contaminated clothing.

If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

If on skin:

Wash affected areas thoroughly with soap and water. Remove contaminated clothing. Wash soiled clothing immediately. If irritation develops, seek medical attention.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. If irritation develops, seek medical attention.

If swallowed:

Rinse mouth and then drink plenty of water. Induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

5. Fire-fighting measures

Flash point:	7 °C	(DIN 51755)
Autoignition:	425 °C	(DIN 51794)
Lower explosion limit:	1.6 %(V)	
Upper explosion limit:	7.7 %(V)	

Suitable extinguishing media:

water fog, foam, dry extinguishing media

Unsuitable extinguishing media for safety reasons:

water

Hazards during fire-fighting:

No particular hazards known.

Protective equipment for fire-fighting:

Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

If exposed to fire, keep containers cool by spraying with water.

NFPA Hazard codes:

Health : 1 Fire: 3 Reactivity: 0 Special:

Safety data sheet

Diethyl ketone

Revision date : 2006/04/10
Version: 1.0

Page: 3/7
(30036696/MDS_GEN_US/EN)

6. Accidental release measures

Personal precautions:

Breathing protection required.

Environmental precautions:

Substance/product is RCRA hazardous due to its properties.

Cleanup:

Spills should be contained, solidified, and placed in suitable containers for disposal.

7. Handling and storage

Handling

General advice:

See MSDS section 10 - Stability and reactivity. See MSDS section 5 - Fire fighting measures.

Protection against fire and explosion:

See MSDS section 5 - Fire fighting measures.

Storage

General advice:

Keep container tightly closed in a cool, well-ventilated place.
Avoid extreme heat. Keep away from sources of ignition - No smoking.

Storage stability:

Storage temperature: 20 °C
Storage duration: 24 Months

8. Exposure controls and personal protection

Components with workplace control parameters

pentan-3-one

ACGIH

TWA value 200 ppm ; STEL value 300 ppm ;

Advice on system design:

Provide local exhaust ventilation to control vapours/mists.

Personal protective equipment

Respiratory protection:

Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator. Do not exceed the maximum use concentration for the respirator facepiece/cartridge combination. For emergency or non-routine, high exposure situations, use a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions. Observe OSHA regulations for respirator use (29 CFR 1910.134).



The Chemical Company

Safety data sheet

Diethyl ketone

Revision date : 2006/04/10

Version: 1.0

Page: 4/7

(30036696/MDS GEN US/EN)

Hand protection:

Chemical resistant protective gloves, Consult with glove manufacturer for testing data.

Eye protection:

Tightly fitting safety goggles (chemical goggles).

General safety and hygiene measures:

Eye wash fountains and safety showers must be easily accessible. Wear protective clothing as necessary to prevent contact.

9. Physical and chemical properties

Form:	liquid	
Odour:	ketone-like	
Colour:	colourless to yellow	
pH value:	approx. 6	(50 g/ml)
Melting point:	-39 °C	
Boiling point:	101 - 102 °C	
Vapour pressure:	37.6 mbar	(20 °C)
Density:	0.815 g/cm ³	(20 °C)
Partitioning coefficient n-octanol/water (log Pow):	0.85	
Solubility in water:		(20 °C) slightly soluble
Solubility (qualitative):	miscible	
	solvent(s): organic solvents,	

10. Stability and reactivity

Substances to avoid:

No data available.

Hazardous reactions:

The product is chemically stable.

Corrosion to metals:

No corrosive effect on metal.

11. Toxicological information

Acute toxicity

Oral:

LD50/rat: approx. 2,900 mg/kg

Moderately toxic.

Inhalation:

Inhalation-risk test (IRT): No mortality within 10 minutes as shown in animal studies. Deaths possible with prolonged exposure.

Dermal:

LD50/rabbit: 16,200 mg/kg



The Chemical Company

Safety data sheet

Diethyl ketone

Revision date : 2006/04/10

Page: 5/7

Version: 1.0

(30036696/MDS_GEN_US/EN)

Skin irritation:

rabbit: non-irritant (BASF-Test)

Eye irritation :

rabbit: Nonirritating.

Sensitization:

No sensitizing effect.

12. Ecological information

Environmental fate and transport

Biodegradation:

Test method: APHA 'Standard Methods', No. 219, 1971, municipal sewage treatment plant effl.

Method of analysis: BOD of the ThOD

Degree of elimination: 75 % (5 d)

Evaluation: Readily biodegradable (according to OECD criteria).
Literature data.

Bioaccumulation:

Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

Chemical oxygen demand (COD):

2,246 mg/g

Biochemical oxygen demand (BOD):

Incubation period 5 d: 1,310 mg/g

Environmental toxicity

Acute and prolonged toxicity to fish:

Fathead minnow/LC50 (96 h): 1,540 mg/l

The statement of the toxic effect relates to the analytically determined concentration. Literature data.

Acute toxicity to aquatic invertebrates:

Directive 79/831/EEC Daphnia magna/EC50 (48 h): > 500 mg/l

Nominal concentration.

Toxicity to aquatic plants:

DIN 38412 Part 9 green algae/EC50 (72 h): > 500 mg/l

Nominal concentration.

Toxicity to microorganisms:

DIN 38412 Part 8 bacterium/EC50 (17 h): > 10,000 mg/l

Nominal concentration.



The Chemical Company

Safety data sheet

Diethyl ketone

Revision date : 2006/04/10

Version: 1.0

Page: 6/7

(30036696/MDS GEN US/EN)

13. Disposal considerations

Waste disposal of substance:

Dispose of in a RCRA-licensed facility.

Do not discharge into waterways or sewer systems without proper authorization.

Dispose of in accordance with national, state and local regulations.

Container disposal:

Empty containers with less than 1 inch of residue may be landfilled at a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

RCRA: D001

14. Transport information

Land transport

USDOT

Proper shipping name:	DIETHYL KETONE
Hazard class:	3
ID-number:	UN 1156
Packing group:	II

Sea transport

IMDG

Proper shipping name:	DIETHYL KETONE
Hazard class:	3
ID-number:	UN 1156
Packing group:	II
Marine pollutant:	NO

Air transport

IATA/CAO

Proper shipping name:	DIETHYL KETONE
Hazard class:	3
ID-number:	UN 1156
Packing group:	II

15. Regulatory information

Federal Regulations

EPAPA005000841

Safety data sheet Diethyl ketone

Revision date : 2006/04/10
Version: 1.0

Page: 7/7
(30036696/MDS GEN US/EN)

Registration status:
TSCA, US released / listed

OSHA hazard category: ACGIH TLV established, Skin and/or eye irritant, OSHA PEL established,
Flammable Liquid

SARA hazard categories (EPCRA 311/312): Fire, Acute

State regulations

State RTK

CAS Number
96-22-0

Chemical name
pentan-3-one

State RTK
MA, NJ, PA

16. Other information

HMIS III rating
Health: 1 Flammability: 3 Physical hazard: 0

HMIS uses a numbering scale ranging from 0 to 4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates high hazard.

Local contact information
prod_reg@basf.com

IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY BASF HEREUNDER ARE GIVEN GRATIS AND BASF ASSUMES NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK.
END OF DATA SHEET

MSDS Number: **08764** * * * * * Effective Date: **05/25/06** * * * * * Supersedes: **01/28/05****MSDS****Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-532-2537) for assistance.

DIETHYLENE GLYCOL

1. Product Identification

Synonyms: 2,2'-Oxydiethanol; 2,2'-Oxybisethanol; 2,2' Dihydroxydiethyl ether; CELLOSOLVE®; glycol ether; Glycolethyl ether

CAS No.: 111-46-6

Molecular Weight: 106.14

Chemical Formula: C₄H₁₀O₃

Product Codes:

J.T. Baker: S856

Mallinckrodt: 11413, 4911

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Diethylene Glycol	111-46-6	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED. MAY CAUSE IRRITATION TO SKIN AND EYES.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

DIETHYLENE GLYCOL

Health Rating: 2 - Moderate (Life)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 1 - Slight

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:

Low inhalation hazard unless heated because of low vapor pressure.

Ingestion:

Low acute toxicity. Probable lethal dose to humans is 0.5-5 g/kg. Causes nerve depression, liver and kidney lesions and anuria (urination retardation). Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

Skin Contact:

May be an irritant to skin on prolonged exposure.

Eye Contact:

May be an irritant to eyes and surrounding tissue.

Chronic Exposure:

Liver and kidney lesions and damage.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. Not expected to require first aid measures.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Call a physician if irritation persists.

5. Fire Fighting Measures

Fire:

Flash point: 124C (255F) CC

Autoignition temperature: 229C (444F)

Flammable limits in air % by volume:

l_{el}: 1.6; u_{el}: 10.8

Fire is possible at elevated temperatures or by contact with an ignition source.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

Fire Extinguishing Media:

Powder, alcohol foam, water spray or carbon dioxide.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

AIHA Workplace Environmental Exposure Level (WEEL): Vapor and Aerosol = 50ppm; Aerosol, only = 10mg/m³.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Odorless.

Solubility:

Infinitely soluble.

Specific Gravity:

1.118 @ 20C/20C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

244 - 245C (471 - 473F)

Melting Point:

-6.5C (21F)

Vapor Density (Air=1):

3.66

Vapor Pressure (mm Hg):

1 @ 91.8C (198F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Toxic gases and vapors may be released if involved in a fire. Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizers, strong acids and strong bases.

Conditions to Avoid:

Incompatibles.

11. Toxicological Information

Oral rat LD50: 12565 mg/kg. Skin rabbit LD50: 11.89 g/kg Irritation: eye rabbit, standard Draize: 50 mg mild. Investigated as a tumorigen and reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Diethylene Glycol (111-46-6)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Diethylene Glycol (111-46-6)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	DSL	NDSL	Phil.
Diethylene Glycol (111-46-6)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302- RQ	TPQ	-SARA 313- List	Chemical Catg.
Diethylene Glycol (111-46-6)	No	No	No	Glycol ether

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8 (d)
Diethylene Glycol (111-46-6)	No	No	No

Chemical Weapons Convention: No TSCA 12 (b): No CDTA: No
 A 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Activity: No (Pure / Liquid)

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED. MAY CAUSE IRRITATION TO SKIN AND EYES.

Label Precautions:

Wash thoroughly after handling.

Avoid contact with eyes, skin and clothing.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician if irritation develops or persists.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 9.

Disclaimer:

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

DIETHYLENETRIAMINE

1. Product Identification

Synonyms: DETA; bis (2-aminoethyl) amine, 2,2'-Diaminodiethylamine; Aminoethylethandiamine

CAS No.: 111-40-0

Molecular Weight: 103.17

Chemical Formula: $\text{NH}_2\text{C}_2\text{H}_4\text{NHC}_2\text{H}_4\text{NH}_2$

Product Codes: H768

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Diethylene Triamine	111-40-0	100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN OR RESPIRATORY REACTION.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)

DIETHYLENETRIAMINE

Flammability Rating: 1 - Slight

Reactivity Rating: 2 - Moderate

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

Inhalation:

Inhalation can cause severe irritation of mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. High concentrations may cause lung damage. May cause allergic reaction in sensitive individuals.

Ingestion:

Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach. Can cause sore throat, vomiting, diarrhea.

Skin Contact:

Corrosive. Symptoms of redness, pain, and severe burn can occur. May be absorbed through the skin with possible systemic effects. May cause allergic reaction in sensitive individuals.

Eye Contact:

Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

Chronic Exposure:

Individuals chronically exposed may become sensitized, with allergic reactions to exposure.

Aggravation of Pre-existing Conditions:

Some individuals may become sensitized. Once acquired, sensitivity may be retained for many years, with possible cross-sensitization to other amines. Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.

Ingestion:

DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Call a physician immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.

Eye Contact:

Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.

5. Fire Fighting Measures

Fire:

Flash point: 102C (216F) CC

Autoignition temperature: 395C (743F)

Flammable limits in air % by volume:

lcl: 1.9; uel: 11.6

DIETHYLENETRIAMINE

Low fire hazard when exposed to heat or flames.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide. Direct stream of water can scatter and spread flames.

Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Storage and use areas should be No Smoking areas. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-ACGIH Threshold Limit Value (TLV): 1 ppm (TWA) (skin)

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134).

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Yellow liquid.

Odor:

Slight ammonia odor.

Solubility:

Completely soluble in water.

Specific Gravity:

0.96 @ 20C/20C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

No information found.

Boiling Point:

207C (405F)

Melting Point:

-39C (-38F)

Vapor Density (Air=1):

3.56

Vapor Pressure (mm Hg):

0.37 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Hygroscopic.

Hazardous Decomposition Products:

May form carbon oxides, nitrogen oxides, hydrocarbons and amine vapors when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

This material is a strong alkaline. It reacts with carbon dioxide from the air; reacts violently with strong oxidants, acids, halogens, and reactive organic compounds; is corrosive toward aluminum, zinc, copper and its alloys; and causes spontaneous ignition with cellulose nitrate.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 1080 mg/kg; skin rabbit LD50: 1090 mg/kg.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Diethylene Triamine (111-40-0)	No	No	None

12. Ecological Information

Environmental Fate:

When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to biodegrade. When released into water, this material is not expected to evaporate significantly. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: DIETHYLENETRIAMINE

Hazard Class: 8

UN/NA: UN2079

Packing Group: II

Information reported for product/size: 500ML

International (Water, I.M.O.)

Proper Shipping Name: DIETHYLENETRIAMINE

Hazard Class: 8

UN/NA: UN2079

Packing Group: II

Information reported for product/size: 500ML

International (Air, I.C.A.O.)

Proper Shipping Name: DIETHYLENETRIAMINE

Hazard Class: 8

UN/NA: UN2079

Packing Group: II

Information reported for product/size: 500ML

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----
 Ingredient TSCA EC Japan Australia

Diethylene Triamine (111-40-0) Yes Yes Yes Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient Korea DSL --Canada-- NDSL Phil.

Diethylene Triamine (111-40-0) Yes Yes No Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient -SARA 302- -SARA 313-
 RQ TPQ List Chemical Catg.

Diethylene Triamine (111-40-0) No No No No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient CERCLA -RCRA- -TSCA-
 261.33 8(d)

Diethylene Triamine (111-40-0) No No No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 2X

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 3 Flammability: 1 Reactivity: 0

Label Hazard Warning:

DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN OR RESPIRATORY REACTION.

Label Precautions:

Do not breathe vapor.

Do not get in eyes, on skin, or on clothing.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing

DIETHYLENETRIAMINE

contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases call a physician immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet

Diisopropylbenzene (Tech), 98% (GC)

MSDS# 31799

Section 1 - Chemical Product and Company Identification

MSDS Name:

Diisopropylbenzene (Tech), 98% (GC)

Catalog Numbers:

40781-0000, 40781-0010, 40781-0030

Synonyms:

Company Identification: Fisher Scientific UK

Bishop Meadow Road, Loughborough

Leics. LE11 5RG

For information in Europe, call: (01509) 231166

Emergency Number, Europe: 01509 231166

Section 2 - Composition, Information on Ingredients

CAS#: 25321-09-9

Chemical Name: Diisopropylbenzene

%: 98

EINECS#: 246-835-6

Hazard Symbols:

None listed

Risk Phrases:

None listed

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available

Potential Health Effects

Eye:

Causes eye irritation.

Skin:

Causes skin irritation.

Ingestion:

May cause irritation of the digestive tract.

Inhalation:

May cause respiratory tract irritation.

Chronic:

Section 4 - First Aid Measures

Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin:

Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion:

If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation:

Remove from exposure and move to fresh air immediately. If not

breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media:

Use agent most appropriate to extinguish fire.

Section 6 - Accidental Release Measures

General Information:

Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal.

Section 7 - Handling and Storage

Handling:

Wash thoroughly after handling. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.

Storage:

Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 25321-09-9:

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State:

Clear liquid

Color:

Not available

Odor:

Not available

pH: Not available
Vapor Pressure: 0.25 mm Hg @25C
Viscosity: Not available
Boiling Point: 77.0 - 82.0 deg C @ 10.00mm H
Freezing/Melting Point: Not available
Autoignition Temperature: Not available
Flash Point: 71 deg C (159.80 deg F)
Explosion Limits: Lower:Not available
Explosion Limits: Upper:Not available
Decomposition Temperature: Not available
Solubility in water: Not available
Specific Gravity/Density: .8570g/cm3
Molecular Formula: C12H18
Molecular Weight: 162.27

Section 10 - Stability and Reactivity

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials.
Incompatibilities with Other Materials
Strong oxidizing agents.
Hazardous Decomposition Products
Irritating and toxic fumes and gases.
Hazardous Polymerization
Has not been reported.

Section 11 - Toxicological Information

ECS#:
CAS# 25321-09-9: CZ6330000
LD50/LC50:
RTECS: CAS# 25321-09-9: Draize test, rabbit, eye: 500
mg/24H Mild; Draize test, rabbit, skin: 100 mg/24H Moderate;
Oral, rat: LD50 = 6500 uL/kg; Skin, rabbit: LD50 = 16
mL/kg;.
Carcinogenicity:
Diisopropylbenzene -
Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Other:
See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Other:

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

IATA

Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:

O

Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:

Packing Group:

RID/ADR

Shipping Name: Not regulated as a hazardous material

Hazard Class:

UN Number:

Packing Group:

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 25321-09-9: 1

Canada

CAS# 25321-09-9 is listed on Canada's DSL List

US Federal

TSCA

CAS# 25321-09-9 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date:

3/24/1998

Revision #4 Date

3/16/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

Material Safety Data Sheet

Di-n-butylamine

MSDS# 06410

Section 1 - Chemical Product and Company Identification

MSDS Name:

Di-n-butylamine

Catalog Numbers:

11295-5000, D/1338/07, D/1338/PB07, D/1340/08, D/1340/PB08

Synonyms:

N-Butyl-1-butanamine; Di-n-butylamine; secondary alkyl amine.

Company Identification: Fisher Scientific UK

Bishop Meadow Road, Loughborough

Leics. LE11 5RG

For information in Europe, call: (01509) 231166

Emergency Number, Europe: 01509 231166

Section 2 - Composition, Information on Ingredients

CAS#: 111-92-2

Chemical Name: Di-n-butylamine

%: 99

EINECS#: 203-921-8

Hazard Symbols:

C

Risk Phrases:

R 20/21/22 34

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable. Harmful by inhalation, in contact with skin and if swallowed. Causes burns.

Potential Health Effects

Eye:

Causes eye burns.

Skin:

Harmful if absorbed through the skin. Causes skin burns.

Ingestion:

Harmful if swallowed. Causes gastrointestinal tract burns.

Inhalation:

Harmful if inhaled. Causes chemical burns to the respiratory tract.

Chronic:

Chronic exposure may cause effects similar to those of acute exposure.

Section 4 - First Aid Measures

Eyes:

Get medical aid immediately. Immediately flush eyes with plenty of water for at least 15 minutes.

Skin:

Get medical aid immediately. Rinse area with large amounts of water for at least 15 minutes.

Ingestion:

Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.

Inhalation:

Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Extinguishing Media:

Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Section 6 - Accidental Release Measures

General Information:

Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Provide ventilation. Approach spill from upwind. Use water spray to cool and disperse vapors and protect personnel.

Section 7 - Handling and Storage

Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame.

Storage:

Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 111-92-2:

Germany: 5 ppm TWA (exposure factor 1); 29 mg/m³ TWA (exposure factor 1)

Germany: skin notation

Personal Protective Equipment

Eyes:

Wear chemical splash goggles and face shield.

Skin:

Wear appropriate gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Color: clear, colorless
Odor: amine-like - malodorous
pH: 12.2 (0.1M aq soln)
Vapor Pressure: 2.59 mm Hg @ 25 deg C
Viscosity: 0.9 mPa s 20 C
Boiling Point: 159 deg C (318.20F)
Freezing/Melting Point: -62 deg C (-79.60F)
Autoignition Temperature: 260 deg C (500.00 deg F)
Flash Point: 39 deg C (102.20 deg F)
Explosion Limits: Lower: .60
Explosion Limits: Upper: 6.80
Decomposition Temperature: Not available
Solubility in water: Slightly soluble
Specific Gravity/Density: 0.76
Molecular Formula: C8H19N
Molecular Weight: 129.24

Section 10 - Stability and Reactivity

Chemical Stability:

Stable under normal temperatures and pressures. Amines absorb carbon dioxide from the air to form carbamate salts.

Conditions to Avoid:

Ignition sources.

Incompatibilities with Other Materials

Strong oxidizing agents, strong acids.

Hazardous Decomposition Products

Nitrogen oxides, carbon monoxide, carbon dioxide.

Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 111-92-2: HR7780000

LD50/LC50:

RTECS: CAS# 111-92-2: Oral, mouse: LD50 = 290 mg/kg;

Oral, rat: LD50 = 189 mg/kg; Skin, rabbit: LD50 = 770 mg/kg;.

Other: Inhalation, rats LC50: > 2.0 mg/l/1H (Mortality was not observed.) Air Products & Chemicals; Inhalation, rats LC50: > 573 ppm/1H (Mortality was not observed.) Huntingdon Research Centre; Inhalation, rats LC50: 1.15 mg/l/4H. Huntingdon Research Centre.

Carcinogenicity:

Di-n-butylamine -

Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

her:

See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

IATA

Shipping Name: Di-n-BUTYLAMINE
Hazard Class: 8 (3)
UN Number: 2248
Packing Group: II

IMO

Shipping Name: DI-n-BUTYLAMINE
Hazard Class: 8 (3)
UN Number: 2248
Packing Group: II

RID/ADR

Shipping Name: DI-n-BUTYLAMINE
Hazard Class: 8 (3)
UN Number: 2248
Packing Group: II

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: C

Risk Phrases:

R 10 Flammable.
R 20/21/22 Harmful by inhalation, in contact with
skin and if swallowed.
R 34 Causes burns.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.
S 26 In case of contact with eyes, rinse immediately
with plenty of water and seek medical advice.
S 28 After contact with skin, wash immediately
with...
S 36/37/39 Wear suitable protective clothing, gloves
and eye/face protection.
S 45 In case of accident or if you feel unwell, seek
medical advice immediately (show the label where
possible).

WGK (Water Danger/Protection)

CAS# 111-92-2: 1

Section 16 - Other Information

MSDS Creation Date:

12/12/1997

Revision #7 Date

5/16/2007

Section 16 - Other Information

MSDS Creation Date:

12/12/1997

Revision #7 Date

5/16/2007

Revisions were made in Sections:

2, 3, 14

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

Material Safety Data Sheet

Airgas

Dipropylene Glycol

Section 1. Chemical product and company identification

Product Name : Dipropylene Glycol
Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
Synonym : dipropylene glycol
MSDS# : 001111
Date of Preparation/Revision : 9/27/2006.
In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Liquid.
Emergency overview : Warning!
CAUSES DAMAGE TO THE FOLLOWING ORGANS: SKIN, EYES.
COMBUSTIBLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FIRE.
Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation.

Potential acute health effects

yes : May cause severe eye irritation.
Skin : This product may irritate skin upon contact.
Inhalation : Harmful by inhalation.
Ingestion : Harmful if swallowed.
Potential chronic health effects : **CARCINOGENIC EFFECTS** Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS Not available.

Medical conditions aggravated by overexposure : Repeated or prolonged exposure is not known to aggravate medical condition.

See toxicological Information (section 11)

Section 3. Composition, Information on Ingredients

United States

propanol, oxybis-

25265-71-8 100

Exposure limits

Section 4. First aid measures

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Section 5. Fire fighting measures

Flammability of the product : May be combustible at high temperature.

Auto-ignition temperature : 310°C (590°F)

Products of combustion : These products are carbon oxides (CO, CO₂).

Fire hazards in presence of various substances : Highly flammable in presence of heat.

Fire fighting media and instructions : In case of fire, use water spray (fog), foam, dry chemicals, or CO₂.

Combustible liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Special protective equipment for fire-fighters : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Do not touch or walk through spilled material.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion proof means to transfer material to a sealed, appropriate container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal.

Section 7. Handling and storage

Handling : Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Storage : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8. Exposure Controls, Personal Protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product name

Exposure limits

Dipropylene Glycol

United States

panol, oxybis-

Section 9. Physical and chemical properties

Physical state	: Liquid.
Color	: Colorless.
Odor	: Odorless.
Molecular weight	: 134.2 g/mole
Molecular formula	: C ₆ H ₁₄ O ₃
Boiling/condensation point	: 228°C (442.4°F)
Melting/freezing point	: -40°C (-40°F)
Specific gravity	: 1.02 (Water = 1)
Evaporation rate	: <0.01 compared to Butyl acetate.

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Reactive with oxidizing agents.

Section 11. Toxicological information

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
propanol, oxybis-	LD50	14850 mg/kg	Oral	Rat

Chronic effects on humans : Causes damage to the following organs: skin, eyes.

Other toxic effects on humans : Not considered to be toxic for humans.

Specific effects

Carcinogenic effects	: No known significant effects or critical hazards.
Mutagenic effects	: No known significant effects or critical hazards.
Reproduction toxicity	: No known significant effects or critical hazards.

Section 12. Ecological information

Products of degradation	: These products are carbon oxides (CO, CO ₂) and water.
Toxicity of the products of biodegradation	: The product itself and its products of degradation are not toxic.




Section 13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Consult your local or regional authorities.

Section 14. Transport information

Dipropylene Glycol

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
Mexico Classification	Not regulated.	-	-	-		-

Section 15. Regulatory informationUnited States

- HCS Classification : Combustible liquid
Target organ effects
- U.S. Federal regulations : TSCA 8(b) inventory: propanol, oxybis-
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: No products were found.
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found.
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean air act (CAA) 112 accidental release prevention: No products were found.
Clean air act (CAA) 112 regulated flammable substances: No products were found.
Clean air act (CAA) 112 regulated toxic substances: No products were found.
- State regulations : Pennsylvania RTK: propanol, oxybis-: (generic environmental hazard)

Canada

- WHMIS (Canada) : Not controlled under WHMIS (Canada).
CEPA DSL: propanol, oxybis-

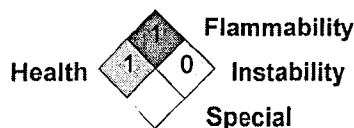
Section 16. Other information

- Label Requirements : CAUSES DAMAGE TO THE FOLLOWING ORGANS: SKIN, EYES.
COMBUSTIBLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FIRE.

Hazardous Material
Information System (U.S.A.) :

Health	*	1
Fire hazard		1
Reactivity		0
Personal protection		A

National Fire Protection
Association (U.S.A.) :



Dipropylene Glycol

Notice to reader

the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Trade name: Di-sec-butylamine
subst.code: 36748
Product no.: IVTP005

Version : 5 / Def

Status: 12.02.2003
Date of printing : 07.03.2003

1.) Identification of the substance/preparation and company

Product details

Trade name

Di-sec-butylamine

Use

chemical intermediates (including monomers)

Identification of the manufacturer / supplier

Address

Celanese Chemicals Europe GmbH
Frankfurter Straße 111
D-61476 Kronberg/Ts.

Information provided by / telephone

EHSA Europe FAX-Nr.: +49 (0) 208 693 2053

Emergency telephone number +49 (0) 69-305 6418

2.) Composition / information on ingredients

Chemical characterization

Di-(1-methylpropyl) amine

Substance / product identification

CAS no.	626-23-3	Index no.	612-049-00-0
EINECS no.	210-937-9	ELINCS number :	

Hazardous Ingredients

Di-sec-butylamine

CAS no.	626-23-3		
EINECS no.	210-937-9		
Concentration	>= 98,5	%-b.w.	%-b.w.
Classification	R10		
	Xn;R20/21/22		

3.) Hazards possibilities

Hazard symbols

F	Highly flammable
T	Toxic

R phrases

11	Highly flammable.
20/22	Harmful by inhalation and if swallowed.
24	Toxic in contact with skin.
35	Causes severe burns.

Trade name: Di-sec-butylamine

subst.code: 36748

Version : 5 / Def

Status: 12.02.2003

Date of printing : 07.03.2003

Product no.: IVTP005

4.) First aid measures

General information

Remove contaminated clothing immediately and dispose of safely.

After inhalation

When inhaled remove to fresh air and seek medical aid.

After skin contact

Rinse affected skin for at least ten minutes with cold water, then bathe in 3% acetic acid for 30 minutes.

Treat wounds like burn wounds. Immediate medical treatment necessary, as untreated burns can result in slow-healing wounds

After eye contact

In case of contact with eyes rinse thoroughly with plenty of lukewarm water and seek medical advice

After ingestion

Summon a doctor immediately.

Advice to doctor**Symptoms**

Shortness of breath; Convulsions; Coughing; hypertensive effect

Hazards

Risk of stomach perforation; Risk of pulmonary oedema

Treatment

Symptoms appear mostly after several hours. If swallowed, flush stomach; Continue to monitor for pneumonia and pulmonary oedema. Treat skin and mucous membranes with antihistamines and corticosteroid preparations. In the event of pulmonary irritation treat initially with dexamethasone - dosing aerosol.

5.) Fire-fighting measures

Suitable extinguishing media

Foam; Dry powder; Carbon dioxide; Water spray jet

Extinguishing media that must not be used for safety reasons

strong water jet

Special exposure hazards arising from the substance or preparation itself, its combustion products or from resulting gases

In case of fires, hazardous combustion gases are formed: Carbon monoxide (CO). Carbon dioxide (CO₂); Nitrous gases (NO_x); Combustion gases of organic materials must in principle be graded as inhalation poisons.

Special protective equipment for firefighting

Use self-contained breathing apparatus.

Other information (chapter 5.)

Cool endangered environment with water spray jet.

6.) Accidental release measures

Personal precautions

Avoid contact with eyes and skin. Keep away sources of ignition. Ensure adequate ventilation.

Environmental precautions

Prevent spread over a wide area (e.g. by containment or oil barriers). Do not discharge into the drains/surface waters/groundwater.

Trade name: Di-sec-butylamine

subst.code: 36748

Version : 5 / Def

Status: 12.02.2003

Date of printing : 07.03.2003

Product no.: IVTP005

Methods for cleaning up/taking up

Pick up with absorbent material (eg sand, kieselgur, acid binder, universal binder, sawdust). Dispose of contaminated material as prescribed

7.) Handling and storage**Handling****Advice on safe handling**

Provide good ventilation of working area (local exhaust ventilation if necessary). Transfer and handle only in enclosed systems.

Advice on protection against fire and explosion

Keep away from sources of ignition - refrain from smoking. Take precautionary measures against static charges. In case of fire, emergency cooling with water spray should be available

Temperature class

T2

Use

Agrochemicals

Storage**Hints on storage assembly**

Keep in cool, well ventilated place away from acids; Do not store with strong oxidizing agents.

Further information on storage conditions

Keep container tightly closed. Store under nitrogen

8.) Exposure controls / personal protection**Ingredients with occupational exposure limits to be monitored**

None

Personal protective equipment**Respiratory protection**

filter apparatus, filter A; Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus.

Hand protection**Chemical resistant gloves****Appropriate Material****Type**

Nitrile rubber

Fleximax (Company COMASEC) or comparable article; or refer to glove producer recommendation.

evaluation

according to EN 374: level 6

Material thickness

appr. 0,55 mm

Time for permeation

> 480 min

Chemical resistant gloves**Appropriate Material****Type**

PVC

Strongoflex Double Dip (Company NorthChem) or comparable article; or refer to glove producer recommendation.

evaluation

Suitable according to practical experience.

Material thickness

appr. 0,8 mm

Eye protection

Tightly fitting safety glasses

Trade name: Di-sec-butylamine

subst.code: 36748

Version : 5 / Def

Status: 12.02.2003

Date of printing : 07.03.2003

Product no.: IVTP005

Skin protection

protective clothing

General protective and hygiene measures

Contact with eyes and skin must be avoided; Do not inhale vapours. Hold emergency shower available.

Hygienic measures

Do not eat, drink or smoke during work time. Remove soiled or soaked clothing immediately. Wash hands before breaks and after work. Clean skin thoroughly after work; apply skin cream.

9.) Physical and chemical properties**Appearance**

Form	liquid
Colour	colourless
Odour	amine-like

Safety data**Changes in physical state**

type	Melting temperature
Value	< -60

Changes in physical state

type	Boiling temperature
Value	134
Pressure	1013 hPa

Flash point

Value	20	°C
Method	DIN 51755	

Ignition temperature

Value	320	°C
Method	DIN 51794	

Vapour pressure

Value	appr. 14	hPa
Reference temperature	20	°C
Method	calculated	
Value	appr. 60	hPa
Reference temperature	50	°C
Method	calculated	

Density

Value	0.753	g/cm³
Method	DIN 51757	
Reference temperature	20	°C

Viscosity

type	dynamic	
Value	1.2	mPa*s
Reference temperature	20	°C

Solubility in water

Value	7	g/l
Reference temperature	20	°C

EC safety data sheet



Trade name: Di-sec-butylamine
subst.code: 36748
Product no.: IVTP005

Version : 5 / Def

Status: 12.02.2003
Date of printing : 07.03.2003

pH value

Value	appr.	11.5	
Reference temperature		20	°C
Concentration	7		g/l

Octanol/water partition coefficient (log Pow)

Value	2,2
Method	Calculation Hansch/Leo

Other information (chapter 9.)

Incompatible substances: Acids.

10.) Stability and reactivity

Hazardous decomposition products None

Hazardous reactions Reactions with acids and strong oxidising agents.

Thermal decomposition

Remarks No decomposition if used as prescribed.

11.) Toxicological information

Acute toxicity

Acute oral toxicity

LD50	308	mg/kg
Species	rat	

Acute dermal toxicity

LD50	200	- 400	mg/kg
Species	rabbit		

Irritant/corrosive effects

Irritant effect on skin

Species	rabbit
evaluation	strongly corrosive

Irritant effect on eyes

Species	rabbit eye
evaluation	strongly corrosive

Other information

Serious toxic effects are possible in case of contact with large areas of skin; Symptoms of poisoning may only appear after several hours

12.) Ecological information

Data on elimination (persistence and degradability)

Biodegradability

Value	< 30
Method	OECD 302 B
evaluation	not readily degradable

EC safety data sheet

Trade name: Di-sec-butylamine
subst.code: 36748
Product no.: IVTP005

Version : 5 / Def

Status: 12.02.2003
Date of printing : 07.03.2003

Ecotoxic effects**Fish toxicity**

LC50	appr. 80	mg/l
Species	zebra fish	
Duration of exposure	96	h
Method	OECD 203	

Bacteria toxicity

EC0	500	mg/l
Species	activated sludge	
Method	fermentation tube test	

General information / ecology

Remarks	Do not discharge product unmonitored into the environment.
---------	--

13.) Disposal considerations**Product**

Disposal required in compliance with all waste management related local regulations.
The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Uncleaned packaging

Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

14.) Transport information**Land transport ADR/RID**

UN number	2733
Technical name	Amines, flammable, corrosive, n.o.s.
Danger releasing substance	(Di-sec-butylamine)
Class	3
Packaging group	II
Hazard no.	338

Inland waterways transport ADNR

Regulatory information	ADNR: Container -Ship and Tanker
UN number	2733
Technical name	Amines, flammable, corrosive, n.o.s.
Danger releasing substance	(Di-sec-butylamine)
Class	3
Packaging group	II

Marine transport IMDG

UN number	2733
Propper shipping name	Amines, flammable, corrosive, n.o.s.
Danger releasing substance	(Di-sec-butylamine)
Class	3
Packaging group	II
EmS	3-02 (Amdt 30-00) F-E, S-C (Amdt 31-02)

EC safety data sheet



Trade name: Di-sec-butylamine
subst.code: 36748
Product no.: IVTP005

Version : 5 / Def

Status: 12.02.2003
Date of printing : 07.03.2003

Air transport ICAO/IATA

UN number	2733
Propper shipping name	Amines, flammable, corrosive, n.o.s.
Danger releasing substance	(Di-sec-butylamine)
Class	3
Packaging group	II

Dispatch by post
Not permitted

15.) Regulatory information

Hazardous component(s) to be indicated on label

Di-sec-butylamine

Labelling in accordance with EC directives

» "EC-labelling"

Hazard symbols

Xn Harmful

R phrases

10	Flammable.
20/21/22	Harmful by inhalation, in contact with skin and if swallowed.

Water Hazard Class (Ger.)

» Class 1
» Source Classification according to VwVwS, Annex 3

16.) Other information

Other information

Observe national and local legal requirements

R phrases

Di-sec-butylamine

10	Flammable.
20/21/22	Harmful by inhalation, in contact with skin and if swallowed.

This information is based on our present state of knowledge. It shall describe our products regarding safety requirements and shall not be construed as a guarantee or statement of condition and/or quality.





255 Norman.
Lachine (Montreal), Que
H8R 1A3

Material Safety Data Sheet

EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)
(CAN) CANUTEC : 1(613) 996-6666 (24hrs)
(USA) Anachemia : 1(518) 297-4444
(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: D-2B		Not controlled under TDG (Canada). PIN: Not applicable. PG: Not applicable.
		

Section I. Product Identification and Uses

Product name	DODECYL ALCOHOL	CI#	Not available.
Chemical formula	CH ₃ (CH ₂) ₁₁ OH	CAS#	112-53-8
Synonyms	1-Dodecanol, Lauryl alcohol, AC-3934, 36984	Code	AC-3934
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	Formula weight	186.34
		Supersedes	
Material uses	For laboratory use only.		

Section II. Ingredients

Name	CAS #	%	TLV
1) DODECYL ALCOHOL	112-53-8	98	Not established by ACGIH

Toxicity values of the hazardous ingredients	DODECYL ALCOHOL: ORAL (LD50): Acute: 4150 mg/kg (Rat). 1170 mg/kg (Mouse). DERMAL (LD50): Acute: >10 ml/kg (Guinea pig). INTRAVENOUS (LD50): Acute: 390 mg/kg (Rat).
--	---

Section III. Physical Data

DODECYL ALCOHOL

page 2/4

Physical state and appearance / Odor	Moist white solid.
pH (1% soln/water)	Not applicable.
Odor threshold	Not available.
Percent volatile	Not available.
Freezing point	24 to 27°C
Boiling point	260 to 262°C
Specific gravity	0.82 (Water = 1)
Vapor density	7.4 (Air = 1)
Vapor pressure	0.1 mm of Hg (@ 20°C)
Water/oil dist. coeff.	Not available.
Evaporation rate	Not available.
Solubility	Insoluble in cold water.

Section IV. Fire and Explosion Data

Flash point	CLOSED CUP: >109°C
Flammable limits	LOWER: 0.6% UPPER: 4%
Auto-ignition temperature	259°C
Fire degradation products	Oxides of carbon (CO, CO2).
Fire extinguishing procedures	Use DRY chemical, carbon dioxide, or foam. Water or foam may cause frothing. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode.
Fire and Explosion Hazards	The sensitivity to static discharge is not available. The sensitivity to impact is not available. When heated to decomposition it emits acrid smoke and fumes.

Section V. Toxicological Properties

Routes of entry	Ingestion and inhalation. Eye contact. Skin contact. Skin absorption.
Effects of Acute Exposure	Harmful by ingestion, inhalation or skin absorption. Irritant.
Eye	Causes severe irritation.
Skin	Causes skin irritation.
Inhalation	Material is irritating to mucous membranes and upper respiratory tract.
Ingestion	No specific information is available on this material.

Section V. Toxicological Properties

DODECYL ALCOHOL

page 3/4

Effects of Chronic Overexposure Carcinogenic effects: Not available. Mutagenic effects: Not available. Teratogenic effects: Not available. Toxicity of the product to the reproductive system: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.

Section VI. First Aid Measures

Eye contact Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Call a physician.

Skin contact Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reusing.

Inhalation Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Call a physician.

Ingestion If conscious, wash out mouth with water. Never give anything by mouth to an unconscious or convulsing person. Call a physician.

Section VII. Reactivity Data

Stability Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination.

Hazardous decomp. products Not available.

Incompatibility Oxidizing agents, bases, acids, acid anhydrides, acid chlorides, halogens, acetaldehyde, ethylene oxide, hexamethylene diisocyanate, hydrogen peroxide, sulfuric acid, hypochlorous acid, diisocyanates, isocyanates, lithium aluminum hydride, nitrogen tetroxide, perchloric acid, barium perchlorate, diethyl aluminum bromide, tri-isobutyl aluminum.

Reaction Products Not available. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

DODECYL ALCOHOL

page 4/4

Protective Clothing in case of spill and leak Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves.

Spill and leak Evacuate the area. Eliminate all sources of ignition. Absorb on sand or vermiculite and place in a closed container for disposal. Avoid raising dust. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material.

Waste disposal Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an after burner and scrubber. According to all applicable regulations.

Storage and Handling Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe dust. Keep container tightly closed and dry. Manipulate in a well ventilated area or under an adequate fume hood. Avoid raising dust. Empty containers may contain a hazardous residue. Handle and open container with care. Minimize dust generation and exposure - use dust mask or appropriate protection. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling.

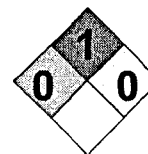
Section IX. Protective Measures

Protective clothing Splash goggles. Impervious rubber gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

Engineering controls Local mechanical exhaust ventilation capable of minimizing dust emissions at the point of use. Do not use in unventilated spaces.

Section X. Other Information

Special Precautions or comments Harmful solid! Irritant! Do not breathe dust. Avoid all contact with the product. Avoid prolonged or repeated exposure. Manipulate in a well ventilated area or under an adequate fume hood. Keep away from heat, sparks and flame. Handle and open container with care. Container should be opened only by a technically qualified person.
RTECS NO: JR5775000 (Dodecyl alcohol).



NFPA

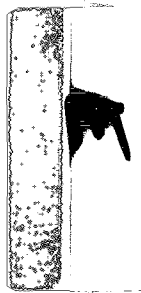
Prepared by MSDS Department/Département de F.S..

Validated 10-Mar-2005

Telephone# (514) 489-5711

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

EPAPA005000880





EMULSIONS
CONTROL
INC.

MATERIAL SAFETY DATA SHEET

PRODUCT/MATERIAL: ECO 53BC

EMERGENCY PHONE NO.

MANUFACTURER: EMULSIONS CONTROL, INC.
925 Hale Place, Suite A-7
Chula Vista, CA 91914

SPILL: 800-633-8253
OFFICE: 619-656-8899

SECTION I – MATERIAL IDENTIFICATION

TRADE NAME:	ECO 53BC	PRODUCT CODE NO:	ECO 53BC
GENERIC NAME:	Oil based demulsifier	MSDS CODE NO:	ECO 53BC
CHEMICAL NAME:	Solvent blend of surface active organic compounds	CAS REGISTRY NO:	Not registered
SYNONYMS:	Emulsion breaker	NOISH REGISTRY NO:	Not registered
CHEMICAL FAMILY:	Hydrocarbon solvents, organic acids and resins	CHEMICAL FORMULA:	Mixture/ liquid/ organic compounds

SECTION II – HAZARD IDENTIFICATION

HEALTH/PHYSICAL HAZARDS: This material is a flammable liquid, a severe eye and skin irritant. Material similar to a major component have been shown to cause skin cancer in laboratory animals.

HAZARD LISTING: Flammable Liquid, n.o.s. (Isopropanol)

OTHER: Warning Label "Flammable Liquid"

Tanks, pipes and containers retain material or material residue. Failure to exercise caution during cleaning, maintenance, repair or sampling operations can be hazardous and lead to injury. Read sections V, VIII & X.

SECTION III – HAZARDOUS INGREDIENTS & RECOMMENDED EXPOSURE LIMITS

HAZARDOUS INGREDIENTS:	RECOMMENDED EXPOSURE LIMITS	
	<u>LIMIT TYPE</u>	<u>AMOUNT AGENCY*</u>
1) Alcohols, ketones, esters, aliphatic and aromatic solvents	8-hr TWA	400 ppm X(I)
2) Surface active organic compounds (Proprietary)	None established	

(i) Recommended by manufacturer

• A = ACGIH; C = CAL/OSHA; M = MSHA; O= OSHA; X = OTHER

EPAPA005000882

PRODUCT/MATERIAL: ECO 53BC

SECTION X – HANDLING DURING ROUTINE & NON-ROUTINE OPERATIONS

STORAGE: Store in closed containers in a cool, dry, well-ventilated area away from sources of heat and ignition and strong oxidizing agents. Containers should be electrically bonded and grounded when transferring material.

HANDLING: Use in a well-ventilated area and recommended protective equipment and clothing. Use explosion-proof tools and equipment. Avoid breathing vapors or mists and prolonged or repeated skin contact. Avoid heating above 70° F. Label all unattended containers.

MISUSE OF EMPTY CONTAINERS CAN BE HAZARDOUS. COMPLETELY DRAIN AND HAVE COMMERCIALY CLEANED BEFORE ANY REUSE. KEEP CONTAINERS CLOSED AND DO NOT USE TO STORE OR MIX ANY OTHER MATERIALS BEFORE THEY HAVE BEEN COMMERCIALY CLEANED. DO NOT CUT, WELD, DRILL, OR SUBJECT EMPTY CONTAINERS TO HEAT OR FLAMES. VAPORS MAY IGNITE AND EXPLODE.

SECTION XI – SPILL, LEAK & DISPOSAL PROCEDURES

SPILL OR LEAK PROCEDURES: Evacuate area for large spills. Remove all ignition sources and provide explosion-proof ventilation. Wear recommended protective clothing and equipment. Do not allow spills to enter sewers, streams or surface waters. Dike and contain spill. Use inert absorbent to reduce fumes and to pick up. Collect for later disposal.

DISPOSAL PROCEDURES: *DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. Empty containers should be commercially cleaned and reconditioned before reuse.*

SECTION XII – PHYSICAL DESCRIPTION & PROPERTIES

DESCRIPTION: A brown or red colored liquid with a slightly pungent odor.

MELTING POINT:	N/A	SOLUBILITY (WATER):	Negligible
BOILING POING/RANGE:	133-760° F	pH:	N/A
OVERPOINT:	N/A	SPECIFIC GRAVITY:	0.90-0.93
VAPOR PRESSURE:	65-75 mm of Hg @ 20° C	API GRAVITY:	N/A
% VOLATILE BY VOLUME:	30-50%	VISCOSITY:	N/A
VAPOR DENSITY:	Heavier than air	POUR POINT:	N/A
EVAPORATION RATE:	2.5-4 (N-Butyl Acetate=1)	OTHER:	None

MSDS CODE NO:	ECO 53BC	NEW/REVISION DATE:	February 13, 2006
PREPARED BY:	Sam Delchad, Ph.D.	DATE:	2-13-06

PRODUCT/MATERIAL: ECO 53BC

SECTION VII – CHEMICAL REACTIVITY INFORMATION

STABILITY: Stable under normal conditions of storage and handling.

REACTIVITY: Reacts with strong oxidizing agents and alkaline materials.

INCOMPATIBILITY: Strong oxidizing agents, alkaline materials

HAZARDOUS REACTION/DECOMPOSITION PRODUCTS: Carbon dioxide and carbon monoxide, oxides of sulfur and nitrogen.

SECTION VIII – FIRE & EXPLOSION HAZARD INFORMATION

NFPA RATING: **HEALTH:** 2 **FLAMMABILITY:** 3 **REACTIVITY:** 0

FLASH POINT (METHOND): <70° F (PMCC)

FIRE POINT/AUTOIGNITION TEMP: No data

FLAMMABLE LIMITS (% BY VOLUME/AIR):

LOWER 1 **UPPER** 4%

FIRE/EXPLOSION HAZARDS: This material is a moderate fire and explosion hazard and may be ignited by an ignition source above its flash point. Vapors may travel to ignition source and flash back. Containers may explode in fire. A vapor explosion hazard indoors, outdoors or in sewers. Empty containers retain material residue and may generate vapors which can ignite and explode.

COMBUSTION PRODUCT: Carbon dioxide, carbon monoxide and water vapor. Oxides of sulfur and nitrogen.

EXTINGUISHING MEDIA: Carbon dioxide and dry chemical. Do not use water.

FIRE FIGHTING PROCEDURES: Fire fighters should wear full protective clothing and equipment, including self-contained breathing apparatus when fighting fires in enclosed spaces. Use water spray to cool containers, to dilute and disperse vapors, protect personnel, and to flush unignited spills from fire.

SECTION IX – PERSONAL PROTECTION & ENGINEERING CONTROLS

EYE & FACIAL PROTECTION: Chemical goggles are recommended to prevent eye contact. In situations where splashing may occur, splash goggles and a face shield should be worn.

SKIN PROTECTION: Impervious protective glove, long-sleeve clothing and a chemical apron are recommended to prevent skin contact (Butyl rubber or polyethylene are recommended!). Wear protective boots in situations where splashing may occur.

RESPIRATORY PROTECTION: In situations where vapor concentrations exceed the recommended exposure limits, a NIOSH-approved organic vapor cartridge respirator should be worn.

VENTILATION: Explosion-proof general mechanical ventilation or local exhaust is recommended to maintain vapor concentrations below the recommended exposure limits

OTHER: An eye wash and source of running water should be available to flush or wash the eyes and skin.

PRODUCT/MATERIAL: ECO 53BC

SECTION IV – HEALTH HAZARD INFORMATION

- GENERAL:** This material is a moderate eye and skin irritant.
- OCULAR/EYE:** This material is a moderate eye irritant. Contact with the liquid may cause burning, redness, swelling, eye burns and eye damage.
- DERMAL/SKIN:** This material is a skin irritant. Prolonged or repeated contact may cause burning, redness, dermatitis, blistering and skin damage.
- INHALATION/BREATHING:** Exposure to mists or to excessive concentrations of vapors generated when this material is heated may cause irritation of nose, throat and respiratory tract and signs of central nervous system depression; i.e., headache, nausea, drowsiness and dizziness.
- INGESTION/SWALLNG:** Accidentally swallowing this material may cause irritation and burning of the mouth, throat, esophagus and gastrointestinal (GI) tract.
- CHRONIC/OTHER:**
- MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing skin, liver, kidney & respiratory disorders.

SECTION V – SEPCIAL HAZARDS & PRECAUTIONS

HAZAROUS DURING HON-ROUTINE OPERATIONS: Tank, pipes and containers contain material or material residue and may contain toxic, irritating, flammable or explosive vapors of high concentrations and pressures. Exposure to these vapors can cause serious physical harm or injury.

SPECIAL PRECAUTIONS & COMMENTS: Enclosed or head spaces in material tanks, pipes or containers y contain hazardous concentrations of fumes or vapors. Exercise caution and wear recommended protective equipment and clothing when opening valves or tank and container lids, entering empty tanks or during any operations such as cleaning, repair, maintenance or sampling where there is a potential for exposure to these fumes or vapors

SECTION VI – EMERGENCY & FIRST AID PROCEDURES

- ATTENTION:** IF VICTIM IS NOT BREATHING OR IF BREATHING DIFFICULTIES DEVELOP, ARTIFICIAL RESPIRATION OR OXYGEN SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL.
- OCULAR/EYE CONTACT:** Immediately flush affected eye(s) with clean water for at least 30 minutes, washing under the eyelids. Seek immediate medical assistance.
- DERMAL/SKIN CONTACT:** Immediately remove contaminated clothing. Flush contact areas with water and then thoroughly cleanse the skin by washing with soap and water. If irritation or redness develop and persist, seek medical assistance.
- INHALATION/BREATHING:** If symptoms of exposure develop, move away from source of exposure to vapors or mists. If symptoms of exposure persist, seek medical assistance.
- INGESTION/SWALLING:** If victim is conscious and alert, have them rinse mouth with water and then drink milk or water. Seek medical assistance.
- COMMENTS/PHYSICIAN INFO:** This material is a viscous petroleum solvent-based mixture of organics, acids, resins and amines which is moderately to severely irritating to the skin, eyes and mucous membranes.

EASTMAN

MATERIAL SAFETY DATA SHEET

Revision Date: 11/15/2004

MSDSUSA/ANSI/EN/150000000343/Version 4.0

T, deport - CES
#1087
Defergest-
Hot wash
Clean Rinse
Dry
Dry

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name	Eastman(TM) Solvent R
Product Identification Number(s)	02860-00, P0286000, P0286001, E0286001
Manufacturer/Supplier	Eastman Chemical Company 200 South Wilcox Drive Kingsport, TN 37660-5280 US +14232292000
MSDS Prepared by	Eastman Product Safety and Health
Chemical Name	not applicable
Synonym(s)	02860-00 446320
Molecular Formula	not applicable
Molecular Weight	not applicable
Product Use	solvent
OSHA Status	hazardous

For emergency health, safety & environmental information, call 800-EASTMAN.

For emergency transportation information, call CHEMTREC at 800-424-9300 or call 800-EASTMAN.

2. COMPOSITION INFORMATION ON INGREDIENTS

(Typical composition is given, and it may vary. A certificate of analysis can be provided, if available.)

Weight %	Component	CAS Registry No.
80%	hydrocarbon C9-C12	not available
15%	hydrocarbon C14-16	not available
5%	hydrocarbon C18-C20	not available

3. HAZARDS IDENTIFICATION

WARNING!

PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DRYING, CRACKING, OR IRRITATION
COMBUSTIBLE LIQUID AND VAPOR
HIGH VAPOR CONCENTRATIONS MAY CAUSE DROWSINESS

HMIS® Hazard Ratings: Health - 2, Flammability - 2, Chemical Reactivity - 0

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

4. FIRST-AID MEASURES

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Page 1

EPAPA005000886

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MATERIAL SAFETY DATA SHEET

Revision Date: 11/15/2004

MSDSUSA/ANSI/EN/15000000343/Version 4.0

Inhalation: If symptomatic, move to fresh air. Get medical attention if symptoms persist.

Eyes: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Get medical attention if symptoms persist.

Skin: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Seek medical advice.

5. FIRE FIGHTING MEASURES

Extinguishing Media: water spray, dry chemical, carbon dioxide, foam

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and protective clothing. Use water spray to keep fire-exposed containers cool. USE WATER WITH CAUTION. Water may be ineffective in fighting the fire. Material will float and may ignite on surface of water. The fire could easily be spread by the use of water in an area where the water could not be contained.

Hazardous Combustion Products: carbon dioxide, carbon monoxide

Unusual Fire and Explosion Hazards: Combustible.

6. ACCIDENTAL RELEASE MEASURES

Wear appropriate personal protective equipment. Eliminate all ignition sources. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste.

For Large Spills: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

7. HANDLING AND STORAGE

Personal Precautionary Measures: Avoid breathing high vapor concentrations. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

Prevention of Fire and Explosion: Keep away from heat, sparks, and flame. Keep from contact with oxidizing materials.

Storage: Keep container tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Country specific exposure limits have not been established or are not applicable unless listed below.

Ventilation: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust

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Page 2

EPAPA005000887

EASTMAN

MATERIAL SAFETY DATA SHEET

Revision Date: 11/15/2004

MSDSUSA/ANSI/EN/150000000343/Version 4.0

ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Eye Protection: It is a good industrial hygiene practice to minimize eye contact.

Skin Protection: Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.

Recommended Decontamination Facilities: safety shower, washing facilities, eye bath

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: liquid

Color: light yellow

Odor: hydrocarbon

Specific Gravity: 0.93

Boiling Point: 177 - 368 °C

Solubility in Water: negligible

Flash Point: 41 °C (Tag open cup)

Thermal Decomposition Temperature: Thermal stability not tested. Low stability hazard expected at normal operating temperatures.

10. STABILITY AND REACTIVITY

Stability: Not fully evaluated. Materials containing similar structural groups are normally stable.

Incompatibility: Material reacts with strong oxidizing agents.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

12. ECOLOGICAL INFORMATION

Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

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Page 3

EPAPA005000888

EASTMAN

MATERIAL SAFETY DATA SHEET

Revision Date: 11/15/2004

MSDSUSA/ANSI/EN/150000000343/Version 4.0

This material has not been tested for environmental effects.

13. DISPOSAL CONSIDERATIONS

Discharge, treatment, or disposal may be subject to national, state, or local laws. Incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT (USA)

Class combustible liquid, Packing group III for quantities of 450 liters (119 gallons) or more; not regulated for smaller quantities

Possible Shipping Description(s):

not regulated

Hydrocarbons, liquid, n.o.s.
combustible liquid (OIL) UN 3295 III

Sea - IMDG (International Maritime Dangerous Goods)

Possible Shipping Description(s):

HYDROCARBONS, LIQUID, N.O.S.
3 UN 3295 III

Air - ICAO (International Civil Aviation Organization)

Possible Shipping Description(s):

Hydrocarbons, liquid, n.o.s.
3 UN 3295 III

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Page 4

EPAPA005000889

EASTMAN

MATERIAL SAFETY DATA SHEET

Revision Date: 11/15/2004

MSDSUSA/ANSI/EN/150000000343/Version 4.0

15. REGULATORY INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: B/3, D/2/B

SARA 311-312 Hazard Classification(s):
immediate (acute) health hazard
fire hazard

SARA 313: none, unless listed below

Carcinogenicity Classification (components present at 0.1% or more): none, unless listed below

TSCA (US Toxic Substances Control Act): All components of this product are listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

16. OTHER INFORMATION

Visit our website at www.EASTMAN.com or call 001-423-229-2000.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment.

Highlighted areas indicate new or changed information.

MATERIAL SAFETY DATA SHEET

REVISION DATE: 01-30-2007

SUPERSEDES: None

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

COMPANY INFORMATION

Specialty Construction Brands, Inc.
(formerly TEC Specialty Products, Inc.)
An H.B. Fuller Company
315 South Hicks Road
Palatine, IL 60067
Phone: 847-358-9500

Medical Emergency Phone Number (24 Hours): 1-888-853-1758
Transport Emergency Phone Number (CHEMTREC): 1-800-424-9300

PRODUCT INFORMATION

PRODUCT IDENTIFIER: 825349PM
PRODUCT NUMBER: TA0440A MTO TINT
PRODUCT DESCRIPTION: Epoxy resin

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Unlisted ingredients are not 'hazardous' per the Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200) and/or are not found on the Canadian Workplace Hazardous Materials Information System ingredient disclosure list. See Section 8 for any additional exposure limit guidelines.

Chemical Name	CAS #	PERCENT	OSHA PEL
Epoxy resin	25085-99-8	50 - 70	Not established
Epoxy resin	68609-97-2	5 - 10	Not established
Glass oxide, bubbles	65997-17-3	5 - 10	TWA 6 MG/M3
Calcium carbonate	471-34-1	1 - 5	TWA (Respirable dust) 5 MG/M3 TWA (Total dust) 15 MG/M3
Titanium dioxide	13463-67-7	1 - 5	TWA (Total dust) 10 MG/M3
Crystalline silica	14808-60-7	0.1 - 1	TWA (Respirable dust) 0.1 MG/M3
Carbon black	1333-86-4	0.1 - 1	TWA 3.5 MG/M3
Titanium dioxide (Rutile)	1317-80-2	0.1 - 1	TWA (Total dust) 10 MG/M3

MATERIAL SAFETY DATA SHEET

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Moderate eye irritant.
Causes skin irritation. May cause allergic skin reaction.

Harmful if swallowed.
Cancer hazard.

HMIS RATING: HEALTH -- 2 FLAMMABILITY -- 1 REACTIVITY -- 0
See SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for personal protective equipment recommendations.

POTENTIAL HEALTH EFFECTS BY ROUTE OF ENTRY

EYE: Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.

SKIN: Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage. May cause sensitization.

INHALATION: Can cause minor respiratory irritation. Inhalation of dusts produced during cutting, grinding or sanding of this product may cause irritation of the respiratory tract.
Overexposure to crystalline silica may cause silicosis. This product contains one or more materials that may be hazardous when present as an airborne dust. During normal handling of the product, the material is encapsulated within the product and will not present an exposure risk. Once the product has reached its final state and is abraded or disturbed, dusting and exposure may occur.

INGESTION: Ingestion is not an anticipated route of exposure. Harmful if swallowed. Irritating to mouth, throat, and stomach.

LONG-TERM (CHRONIC) HEALTH EFFECTS

TARGET ORGAN(S): Skin Lungs

REGULATED CARCINOGEN STATUS:

Unless noted below, this product does not contain regulated levels of NTP, IARC, ACGIH, or OSHA listed carcinogens.

Titanium dioxide

Crystalline silica

Carbon black

Titanium dioxide (Rutile)

EXISTING HEALTH CONDITIONS AFFECTED BY EXPOSURE: Skin disease including eczema and sensitization; Lung disease

SECTION 4: FIRST AID MEASURES

IF IN EYES: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

IF ON SKIN: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

IF VAPORS INHALED: Remove to fresh air. Call a physician if symptoms persist.

MATERIAL SAFETY DATA SHEET

IF SWALLOWED: Do not induce vomiting. Seek medical attention immediately. Drink two glasses of water or milk to dilute. Do not give anything by mouth to an unconscious person. Induced vomiting may lead to aspiration of the material into the lungs potentially causing chemical pneumonitis that may be fatal.

SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT:	Not applicable
AUTOIGNITION TEMPERATURE:	Not established
LOWER EXPLOSIVE LIMIT (% in air):	Not established
UPPER EXPLOSIVE LIMIT (% in air):	Not established
EXTINGUISHING MEDIA:	Use water spray, foam, dry chemical or carbon dioxide.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Material will burn in a fire.
SPECIAL FIRE FIGHTING INSTRUCTIONS:	Persons exposed to products of combustion should wear self-contained breathing apparatus and full protective equipment.
HAZARDOUS COMBUSTION PRODUCTS:	Carbon dioxide, Carbon monoxide Silicon dioxide

SECTION 6: ACCIDENTAL RELEASE MEASURES

SPECIAL PROTECTION:	Exposure to the spilled material may be irritating or harmful. Follow personal protective equipment recommendations found in Section 8 of this MSDS. Additional precautions may be necessary based on special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred.
CLEAN-UP:	Dike if necessary, contain spill with inert absorbent and transfer to containers for disposal. Keep spilled product out of sewers, watersheds, or water systems.

Transport Emergency Phone Number (CHEMTREC): 1-800-424-9300

SECTION 7: HANDLING AND STORAGE

Handling: Harmful or irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area.

Storage: Store in a cool, dry place.

Consult the Technical Data Sheet for specific storage instructions.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE PROTECTION:	Wear safety glasses with side shields when handling this product. Wear additional eye protection such as chemical splash goggles and/or face shield when the possibility exists for eye contact with splashing or spraying liquid, or airborne material. Have an eye wash station available.
SKIN PROTECTION:	Avoid skin contact by wearing chemically resistant gloves and long sleeved shirt. An apron may be appropriate if splashing can occur.
GLOVES:	Nitrile
RESPIRATORY PROTECTION:	Respiratory protection may be required to avoid overexposure when handling this product. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms. NIOSH approved air purifying respirator with dust/mist filter if product is sprayed. Respirators should be selected by and used following requirements found in OSHA's respirator standard (29 CFR 1910.134).
VENTILATION:	Use local exhaust ventilation or other engineering controls to

MATERIAL SAFETY DATA SHEET

minimize exposures.

EXPOSURE LIMITS:

Chemical Name	ACGIH EXPOSURE LIMITS	AIHA WEEL
Epoxy resin	Not established	Not established
Epoxy resin	Not established	Not established
Glass oxide, bubbles	TWA 10 MG/M3	Not established
Calcium carbonate	TWA 10 MG/M3	Not established
Titanium dioxide	TWA 10 MG/M3	Not established
Crystalline silica	TWA (Respirable dust) 0.05 MG/M3	Not established
Carbon black	TWA 3.5 MG/M3	Not established
Titanium dioxide (Rutile)	TWA (Total dust) 10 MG/M3	Not established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
COLOR:	White
ODOR:	Aromatic Mild
ODOR THRESHOLD:	Not established
WEIGHT PER GALLON (lbs.):	9.00
SPECIFIC GRAVITY:	1.08
SOLIDS (% by weight):	100.0
pH:	Not established
BOILING POINT (deg. C):	Not established
FREEZING/MELTING POINT (deg. C):	Not established
VAPOR PRESSURE (mm Hg):	Not established
VAPOR DENSITY:	Not established
EVAPORATION RATE:	Not established
OCTANOL/WATER COEFFICIENT:	Not established

SECTION 10: STABILITY AND REACTIVITY

STABILITY:	Stable under normal conditions.
CHEMICAL INCOMPATIBILITY:	Not established
HAZARDOUS POLYMERIZATION:	Will not occur.
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, carbon dioxide Silicon dioxide

MATERIAL SAFETY DATA SHEET

SECTION 11: TOXICOLOGICAL INFORMATION

CHEMICAL NAME	LD50/LC50
Epoxy resin	Not established
Epoxy resin	Not established
Glass oxide, bubbles	Not established
Calcium carbonate	Oral LD50 Rat = 6450 mg/kg
Titanium dioxide	Not established
Crystalline silica	Not established
Carbon black	Oral LD50 Rat >15400 mg/kg Dermal LD50 Rabbit > 3 g/kg
Titanium dioxide (Rutile)	Not established

TOXICOLOGY SUMMARY: No additional health information available.

SECTION 12: ECOLOGICAL INFORMATION

OVERVIEW: No ecological information available

SECTION 13: DISPOSAL CONSIDERATIONS

To the best of our knowledge, this product does not meet the definition of hazardous waste under the U.S. EPA Hazardous Waste Regulations 40 CFR 261. Disposal via incineration at an approved facility is recommended. Consult state, local or provincial authorities for more restrictive requirements.

SECTION 14: TRANSPORTATION INFORMATION

Consult Bill of Lading for transportation information.

DOT: NOT REGULATED

IATA: NOT REGULATED

SECTION 15: REGULATORY INFORMATION

INVENTORY STATUS

U.S. EPA TSCA: This product is in compliance with the Toxic Substances Control Act's Inventory requirements.

If you need more information about the inventory status of this product call 651-236-5858.

This product may contain chemical substances that are regulated for export by various government agencies (such as the Environmental Protection Agency, the Bureau of Industry and Security, or the Drug Enforcement Administration, among others). Before exporting this product from the USA or Canada, we recommend you contact us at 651-236-5858 (USA) or 450-655-1306 x227 (Canada) to request an export review.

MATERIAL SAFETY DATA SHEET

FEDERAL REPORTING

EPA SARA Title III Section 313

Unless listed below, this product does not contain toxic chemical(s) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR part 372. EPA has advised that when a percentage range is listed the midpoint may be used to fulfill reporting obligations.

Chemical Name	CAS#	%
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WHMIS STATUS: Unless listed below, this product is not controlled under the Canadian Workplace Hazardous Materials Information System.

D2B D2A

STATE REPORTING

Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986:

Unless listed below, this product does not contain known levels of any chemical known to the State of California to cause cancer or reproductive harm.

Chemical Name/List	CAS	Percent
Quartz (Carcinogen)	14808-60-7	0.1 - 1
Carbon black (Carcinogen)	1333-86-4	0.1 - 1
Nickel compounds (Carcinogen)	12607-70-4	0.001 - 0.01
Benzene, ethyl- (Carcinogen)	100-41-4	0.001 - 0.01
Epichlorohydrin (Carcinogen)	106-89-8	< 10 ppm
Lead compounds (Carcinogen)		< 10 ppm
Cadmium compounds (Carcinogen)		< 10 ppm
Benzene (Carcinogen)	71-43-2	< 10 ppm
Benzene (Developmental toxin)	71-43-2	< 10 ppm
Epichlorohydrin (Male reproductive toxin)	106-89-8	< 10 ppm
Benzene (Male reproductive toxin)	71-43-2	< 10 ppm

SECTION 16: ADDITIONAL INFORMATION

This Material Safety Data Sheet is prepared to comply with the United States Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200) and the Canadian Workplace Hazardous Materials Information System (WHMIS).

Prepared by: The Global Regulatory Department
Phone: 651-236-5842

The information and recommendations set forth herein are believed to be accurate. Because some of the information is derived from information provided to Specialty Construction Brands, Inc. from its suppliers, and because Specialty Construction Brands, Inc. has no control over the conditions of handling and use, Specialty Construction Brands, Inc. makes no warranty, expressed or implied, regarding the accuracy of the data or the results to be obtained from the use thereof. The information is supplied solely for your information and consideration, and Specialty Construction Brands, Inc. assumes no responsibility for use or reliance thereon. It is the responsibility of the user of Specialty Construction Brands, Inc. products to comply with all applicable federal, state and local laws and regulations.

Material Safety Data Sheet

Version 3.0
Revision Date 03/22/2007
Print Date 08/16/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Ethyl acetate**

Product Number : 58958
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₄H₈O₂

CAS-No.	EC-No.	Index-No.	Concentration [%]
Ethyl acetate			
141-78-6	205-500-4	607-022-00-5	-

3. HAZARDS IDENTIFICATION**Emergency Overview****OSHA Hazards**

Flammable Liquid
Delayed target organ effects
Moderate eye irritant

Target Organs

Blood, Kidney, Liver, Central nervous system

HMIS Classification

Health Hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating

Health Hazard: 2
Fire : 3
Reactivity Hazard: 1

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin	May be harmful if absorbed through skin. May cause skin irritation. Repeated exposure may cause skin dryness or cracking.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point -3.0 °C (26.6 °F) - closed cup

Ignition temperature 427 °C (801 °F)

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Carbon dioxide (CO₂)

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Ethyl acetate	141-78-6	TWA	400 ppm 1,440 mg/m3	1996-05-18	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004; Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Refers to Appendix A -- Carcinogens. 1996 Adoption				
		TWA	400 ppm 1,400 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	400 ppm 1,400 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Safety glasses

Skin and body protection

impervious clothing, Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	clear, liquid
Colour	colourless

Safety data

pH	no data available
Melting point	-84.0 °C (-119.2 °F)
Boiling point	76.5 - 77.5 °C (169.7 - 171.5 °F)
Flash point	-3.0 °C (26.6 °F) - closed cup
Ignition temperature	427 °C (801 °F)
Lower explosion limit	2.2 %(V)
Upper explosion limit	11.5 %(V)
Vapour pressure	97.3 hPa (73.0 mmHg) at 20.0 °C (68.0 °F)
Density	0.90 g/cm ³
Water solubility	soluble
Partition coefficient (n-octanol/water)	log Pow: 0.73

10. STABILITY AND REACTIVITY**Storage stability**

Stable under recommended storage conditions.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products**Hazardous decomposition products formed under fire conditions.**

Carbon oxides

Hazardous reactions

Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION**Acute toxicity**

LD₅₀ Oral - rat - 5,620 mg/kg

LC₅₀ Inhalation - mouse - 2 h - 45,000 mg/m³

LD₅₀ Dermal - rabbit - > 180,000 mg/kg

Irritation and corrosion

Skin: no data available

Sensitization

Remarks: no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Signs and Symptoms of Exposure

Central nervous system depression, Drowsiness, narcosis, anemia

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Biodegradability Remarks: no data available

Ecotoxicity effects

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 350.00 - 600.00 mg/l - 96 h
LC50 - Pimephales promelas (fathead minnow) - 220.00 - 250.00 mg/l - 96 h

Toxicity to daphnia
and other aquatic
invertebrates. EC50 - Daphnia magna (Water flea) - 2,300.00 - 3,090.00 mg/l - 24 h
LC50 - Daphnia magna (Water flea) - 560 mg/l - 48 h

Toxicity to algae EC50 - No information available. - 4,300.00 mg/l - 24 h
EC50 - SELENASTRUM - 1,800.00 - 3,200.00 mg/l - 72 h

Further information on ecology
no data available

13. DISPOSAL CONSIDERATIONS

Product

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-No.: 1173 Class: 3 Packing group: II
Proper shipping name: Ethyl acetate

IMDG

UN-No.: 1173 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ETHYL ACETATE
Marine pollutant: No

IATA

UN-No.: 1173 Class: 3 Packing group: II
Proper shipping name: Ethyl acetate

15. REGULATORY INFORMATION

OSHA Hazards

Flammable Liquid, Delayed target organ effects, Moderate eye irritant

TSCA Status

On TSCA Inventory

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Ethyl acetate	CAS-No. 141-78-6	Revision Date 1989-12-01
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Pennsylvania Right To Know Components

Ethyl acetate	CAS-No. 141-78-6	Revision Date 1989-12-01
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New Jersey Right To Know Components

Ethyl acetate	CAS-No. 141-78-6	Revision Date 1989-12-01
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California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION**Further information**

Copyright (2007): Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only., The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Close

Material Safety Data Sheet

ULTRA Scientific · 250 Smith Street · North Kingstown, RI, USA 02852 · 401-294-9400

Product # RCC-181

Last Updated: 11/14/2006

Section I Product Identification

Name: Ethyl Alcohol
Matrix: neat compound

Section II Composition / Information on Ingredients

Component	CAS #	% by Wt.	LD50	OSHA PEL	ACGIH TLV	RTECS #	Codes
ethyl alcohol	000064-17-5	100	21000 mg/kg oral rat	N/A	1884 mg/m3	KQ6300000	
Codes: A-OSHA regulated carcinogen; B-IARC Group 1 carcinogen; C-IARC Group 2A carcinogen; D-IARC Group 2B carcinogen; E-NTP Group 1 carcinogen; F-NTP Group 2 carcinogen; G-SARA Title III compound; H-California Proposition 65 compound.							

Section III Hazards Identification

Contains carcinogen(s) or cancer suspect agent(s)

All chemicals should be considered hazardous - direct physical contact should be avoided.

Section IV First Aid Measures

Inhalation: If inhaled, remove to fresh air. Give oxygen, if necessary. Contact a physician.

Skin Contact: In case of skin contact, flush with copious amounts of water. Remove contaminated clothing. Contact a physician.

Eye Contact: In case of eye contact, flush with copious amounts of water, lifting eyelids occasionally. Contact a physician.

Ingestion: If ingested, contact poison center immediately for recommended procedure. Contact a physician.

Section V Fire Fighting Measures

Fire and Explosion Hazard Data for Compound

Fire Hazard: N/A**Extinguishing Media:** Carbon dioxide, dry chemical powder, or water spray.

Section VI Accidental Release Measures

Ventilate area of the leak or spill. Wear appropriate personal protective equipment as specified in Section VIII. A leaking bottle, vial, or ampule may be placed in a plastic bag, and normal disposal procedures followed. Take up spilled material with sand or other non-combustible absorbant material, and place in an appropriate container for later disposal. Flush spill area with water.

Section VII Handling and Storage

May be stored at room temperature

Keep in a tightly closed container, and store in a corrosion proof area.

This product should only be used by persons trained in the safe handling of hazardous chemicals.

Section VIII Exposure Controls / Personal Protection

Ensure that there is adequate ventilation to prevent airborne levels from exceeding recommended exposure limits (see Section II). Use appropriate MSHA/NIOSH approved safety equipment. Wear chemical goggles, face shield, gloves, and chemical resistant clothing, such as a laboratory coat and/or a rubber apron, to prevent contact with eyes, skin, and clothing.

Section IX Physical and Chemical Properties

Physical Data for Compound

Melting Pt.: N/A

Boiling Pt.: N/A

Density: N/A

Vapor Pressure: N/A

Vapor Density: N/A

Water Solubility: N/A

Appearance: N/A

Odor: N/A

Flash Point: N/A

Auto-ignition Temperature: N/A

LEL: N/A

UEL: N/A

Section X Stability and Reactivity

Reactivity Data for Compound

Stability: stable

Incompatibilities: N/A

Hazardous Decomposition Products: N/A

Hazardous Effects of Polymerization: no

Section XI Toxicological Information

See Section II for specific toxicological information for the ingredients of this product.

Section XII Ecological Information

No information is available.

Section XIII Disposal Considerations

Recycle, if possible. Any material which cannot be saved for recovery or recycling should be disposed of at an appropriate and approved waste disposal facility. Processing, use, and/or contamination of this product may change waste management requirements. Observe all applicable federal, state, and local environmental regulations concerning disposal.

Section XIV Transport Information

Shipment Type: Dangerous Goods in Excepted Quantity (US DOT Small Quantity Exemption)

UN Number: UN1170

Shipping Class: 3

Packing Group: II

Section XV Regulatory Information

No information is available.

Section XVI Other Information

The above information is believed to be correct, but does not purport to be all-inclusive. This data should be used only as a guide in handling this material. ULTRA Scientific, Inc., shall not be held liable for any damage resulting from handling or from contact with the above product.

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Material Safety Data Sheet

Ethyl Benzene

ACC# 08780

Section 1 - Chemical Product and Company Identification

MSDS Name: Ethyl Benzene

Catalog Numbers: 02751 1, 02751-1, 027511

Synonyms: Ethylbenzol; Phenylethane

Company Identification:

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
100-41-4	Ethylbenzene	100	202-849-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 21 deg C.

Warning! Causes eye irritation. **Flammable liquid and vapor.** Causes skin irritation. May be absorbed through intact skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. Causes digestive and respiratory tract irritation. May cause central nervous system depression.

Target Organs: Central nervous system.

Potential Health Effects

Eye: Causes moderate eye irritation. Vapors may cause eye irritation.

Skin: Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May be absorbed through the skin. Contact with the liquid may cause erythema (redness), exfoliation and vesiculation (blistering).

Ingestion: May cause irritation of the digestive tract. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. Vapors may cause dizziness or suffocation.

Chronic: Chronic inhalation may cause effects similar to those of acute inhalation.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.

Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out.

Flash Point: 21 deg C (69.80 deg F)

Autoignition Temperature: 810 deg F (432.22 deg C)

Explosion Limits, Lower: 0.8

Upper: 6.7

NFPA Rating: (estimated) Health: 3; Flammability: 4; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ethylbenzene	100 ppm TWA; 125 ppm STEL	100 ppm TWA; 435 mg/m ³ TWA 800 ppm IDLH	100 ppm TWA; 435 mg/m ³ TWA

OSHA Vacated PELs: Ethylbenzene: 100 ppm TWA; 435 mg/m³ TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves and clothing to prevent skin exposure.

Clothing: Wear appropriate protective gloves and clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: aromatic odor

pH: Not available.

Vapor Pressure: 7.1 mm Hg @ 20 C

Vapor Density: 3.7

Evaporation Rate: <1 (butyl acetate=1)

Viscosity: 0.63 mPa s 20 C

Boiling Point: 277 deg F

Freezing/Melting Point: -139 deg F

Decomposition Temperature: Not available.

Solubility: Insoluble.

Specific Gravity/Density: 0.9

Molecular Formula: C₈H₁₀

Molecular Weight: 106.07

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, ignition sources, excess heat.

Incompatibilities with Other Materials: Oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 100-41-4: DA0700000

LD50/LC50:

CAS# 100-41-4:

Draize test, rabbit, eye: 500 mg Severe;

Inhalation, mouse: LC50 = 35500 mg/m³/2H;

Inhalation, rat: LC50 = 55000 mg/m³/2H;

Oral, rat: LD50 = 3500 mg/kg;

Oral, rat: LD50 = 3500 mg/kg;

Skin, rabbit: LD50 = 17800 uL/kg;

al, rat: LD50 = 5.46

Carcinogenicity:

CAS# 100-41-4:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 6/11/04
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

Epidemiology: No information found

Teratogenicity: No information found

Reproductive Effects: No information found

Mutagenicity: Mutation in mammalian somatic cells(Rodent,mouse) Lymphocyte = 80 mg/L.

Neurotoxicity: No information found

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: 14.0 mg/L; 96 Hr.; StaticFish: Fathead Minnow: 12.1 mg/L; 96 Hr.; Flow-throughFish: Bluegill/Sunfish: LC50 =150.0 mg/L; 96 Hr.; Flow-throughWater flea EC50 =2.1 mg/L; 48 Hr.; StaticBacteria: EC50 =9.8 mg/L; 30 minutes; Micotox TestWater flea EC50 =75.0 mg/L; 48 minutes; Static, pH6.7-8.1, 72.0 mg/L CaCO₃ Shrimp (mysidoposis bioassay), LC50=87.6 mg/L/96hr. Sheepshead minnow LC50=275 mg/L/96hr. Fathead minnow LC50=42.3 mg/L/96hr in hard water &48.5 mg/L/96hr in softwater.

Environmental: Experimental data on the bioconcentration of ethylbenzene include a log BCF of

1.9 in goldfish and the log BCF of 0.67 for clams exposed to the water-soluble fraction of crude oil. Using its octanol/water partition coefficient (log Kow= 3.15) and using a recommended regression equation, one can calculate a log BCF in fish of 2.16 indicating that ethylbenzene could not significantly bioconcentrate in aquatic organisms. Ethylbenzene has a moderate adsorption for soil. The measured Koc for silt loam was 164

Physical: The predominant photochemical reaction of ethylbenzene in the atmosphere is with hydroxyl radicals; the tropospheric half-life for this reaction is 5.5 and 24 hr in the summer and winter, actively. Degradation is somewhat faster under photochemical smog situations. Photooxidation products which have been identified include ethylphenol, benzaldehyde, acetophenone and m- and p-ethylnitrobenzene. Ethylbenzene is resistant to hydrolysis. Ethylbenzene does not significantly absorb light above 290 nm in methanol solution.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	ETHYLBENZENE	ETHYL BENZENE
Hazard Class:	3	3
UN Number:	UN1175	UN1175
Packing Group:	II	II
Additional Info:		FLASHPOINT 15C

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 100-41-4 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 100-41-4: Effective 6/19/87, Sunset 6/19/97

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 100-41-4: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 100-41-4: immediate, delayed, fire.

Section 313

This material contains Ethylbenzene (CAS# 100-41-4, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 100-41-4 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

CAS# 100-41-4 is listed as a Hazardous Substance under the CWA. CAS# 100-41-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 100-41-4 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 100-41-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Ethylbenzene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F

Risk Phrases:

R 11 Highly flammable.

R 20 Harmful by inhalation.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 24/25 Avoid contact with skin and eyes.

S 29 Do not empty into drains.

WGK (Water Danger/Protection)

CAS# 100-41-4: 1

Canada - DSL/NDSL

CAS# 100-41-4 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 100-41-4 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 4/28/1999

Revision #4 Date: 10/03/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Ethyl 4-(dimethylamino)butanoate

ACC# 13489

Section 1 - Chemical Product and Company Identification

MSDS Name: Ethyl 4-(dimethylamino)butanoate

Catalog Numbers: XBX00237CB, XBX00237DA, XBX00237ZZ

Synonyms:

Company Identification:

Maybridge PLC

Trevillet, Tintagel

Cornwall, England. PL34 0HW

For information, call: +44(0)1840770453

For emergencies, call: +44(0)7702924616

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
22041-23-2	Ethyl 4-(dimethylamino)butanoate	80+%	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available. Appearance: Not available.

Not available.

Target Organs: Respiratory system, gastrointestinal system, eyes, skin.

Potential Health Effects

Eye: Causes eye burns.

Skin: Harmful if absorbed through the skin. Causes skin burns.

Ingestion: Harmful if swallowed. Causes gastrointestinal tract burns.

Inhalation: Harmful if inhaled. Causes chemical burns to the respiratory tract.

Chronic: Not available.

Section 4 - First Aid Measures

s: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Do not induce vomiting. Get medical aid immediately.

Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Use foam, dry chemical, or carbon dioxide.

Flash Point: Not available

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood.

Storage: Store in a cool, dry place. Store in a tightly closed container. Corrosives area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ethyl 4-(dimethylamino)butanoate	none listed	none listed	none listed

OSHA Vacated PELs: Ethyl 4-(dimethylamino)butanoate: No OSHA Vacated PELs are listed for

this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: Not available.

Odor: Not available.

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 77 - 79 deg C @14mm Hg

Freezing/Melting Point: Not available.

Decomposition Temperature: Not available.

Solubility: Not available.

Specific Gravity/Density: Not available.

Molecular Formula: C₈H₁₇NO₂

Molecular Weight: 159.23

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials.

Incompatibilities with Other Materials: Strong oxidizing agents, strong reducing agents, strong acids, strong bases.

Hazardous Decomposition Products: Carbon monoxide, oxides of nitrogen, carbon dioxide.

Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:

CAS# 22041-23-2: ES9600000

LD50/LC50:

Not available.

Mutagenicity:

CAS# 22041-23-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.

Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	AMINES, LIQUID, CORROSIVE, N.O.S.*	AMINES, LIQUID, CORROSIVE, N.O.S.*
Hazard Class:	8	8
UN Number:	UN2735	UN2735
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 22041-23-2 is not listed on the TSCA inventory. It is for research and development use only.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

ERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 22041-23-2 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations**European Labeling in Accordance with EC Directives****Hazard Symbols:**

C

Risk Phrases:

R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.

R 34 Causes burns.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 22041-23-2: No information available.

Canada - DSL/NDSL

None of the chemicals in this product are listed on the DSL or NDSL list.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 2/10/2006

Revision #0 Date: Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.



Material Safety Data Sheet

Catalog Number: 221711
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 221711

Product name: ETHYL CYCLOPENTANE

Supplier:

MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
ETHYL CYCLOPENTANE	1640-89-7	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable

Category of Danger:
Flammable

Principle routes of exposure: Skin

Inhalation: May cause irritation of respiratory tract

Ingestion: May be harmful if swallowed.

Skin contact: May cause allergic skin reaction

Eye contact: Avoid contact with eyes

Statements of hazard Flammable

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

Precautions - ANSI Label Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Catalog Number: 221711

Product name: ETHYL CYCLOPENTANE

Page 1 of 6

EPAPA005000919

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

Carbon dioxide (CO₂), Dry chemical, Foam, Water may be ineffective., Use dry chemical, CO₂, water spray or 'alcohol' foam.

Specific hazards:

Dangerous fire hazard. Dangerous explosion hazard when exposed to heat or flame. Easily forms explosive mixtures in air. Extremely flammable

Unusual hazards:

None known

Special protective equipment for firefighters:

Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.

Specific methods:

Water mist may be used to cool closed containers.

Flash point:

15.5°C

Autoignition temperature:

260 °C (500 °F)

NFPA rating:

NFPA Health:	1
NFPA Flammability:	3
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Remove all sources of ignition. Use personal protective equipment.

Environmental precautions:

Do not flush into surface water or sanitary sewer system.

Methods for cleaning up:

Soak up with inert absorbent material. Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:

Use only in area provided with appropriate exhaust ventilation.

Safe handling advice:

Wear personal protective equipment. Remove and wash contaminated clothing before reuse.

Technical measures/storage conditions:

Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition

Incompatible products:

Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Impervious clothing Long sleeved clothing

Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless; gasoline-like odor
Physical state:	Liquid
Formula:	C7-H14
Molecular weight:	98.19
Melting point/range:	-138 °C (-216 °F)
Boiling point/range:	103 °C (218 °F)
Density:	0.763 at 20 °C (water = 1)
Vapor pressure:	No data available
Evaporation rate:	No data available
Vapor density:	3.4 (air = 1)
Solubility (in water):	Insoluble
Flash point:	15.5°C
Autoignition temperature:	260 °C (500 °F)

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components

ETHYL CYCLOPENTANE

RTECS Number:

GY4450000

Selected LD50s and LC50s

Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
ETHYL CYCLOPENTANE	Not Listed	Not Listed	Not Listed
Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
ETHYL CYCLOPENTANE	Not Listed	Not Listed	Not Listed
Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
ETHYL CYCLOPENTANE	Not Listed	Not Listed	Not Listed
Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
ETHYL CYCLOPENTANE	Not Listed	Not Listed	Not Listed
Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants	
ETHYL CYCLOPENTANE	Not Listed	Not Listed	

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

**Contaminated packaging:
Methods for cleaning up:**

Do not re-use empty containers
Soak up with inert absorbent material. Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No:

1993

DOT:**Proper shipping name:
IATA Hazard Label(s):
Hazard Class**

Flammable liquid, n.o.s.
Flammable Liquid
3 -
Flammable liquid
II

Packing group:**Emergency Response Guide Number (ERG):**

128

**Components
ETHYL CYCLOPENTANE****U.S. DOT - Appendix A Table 1 - Reportable Quantities**
Not Listed**TDG (Canada):****WHMIS hazard class:**

B2 flammable liquids



IMDG/IMO

Proper shipping name: Flammable liquid, n.o.s.

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutants	U.S. DOT - Appendix B - Severe Marine Pollutants
ETHYL CYCLOPENTANE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
ETHYL CYCLOPENTANE	
Inventory - United States TSCA - Sect. 8(b)	Not Listed
Canada DSL Inventory List -	Not Listed
EU EINECS List -	216-686-1; C7H14
Korean KECL:	KE-13586
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
ETHYL CYCLOPENTANE	Not Listed	[present]	Not Listed	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
ETHYL CYCLOPENTANE	[present]	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
ETHYL CYCLOPENTANE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Catalog Number: 221711

Product name: ETHYL CYCLOPENTANE

Page 5 of 6

EPAPA005000923

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End of Safety Data Sheet



SAFETY DATA SHEET

1. Identification of the substance/preparation and of the company/undertaking

Identification of the product

Catalogue No: 66178

ID No.: 6617800

Product name: Ethyl n-butyrate

Manufacturer/supplier identification

Company: VWR International Ltd, Merck House, Poole, Dorset, BH15 1TD, England
Telephone : 01202 669700 Telefax : 01202 665599

Emergency telephone No.: 01202 669700

2. Composition/information on ingredients

Chemical characterization

Organic liquid

Product name: Ethyl n-butyrate

CAS number: 105-54-4

EC-No.:

3. Hazards identification

Flammable.

4. First aid measures

Eye contact: Irrigate thoroughly with water. If discomfort persists obtain medical attention.

Inhalation: Remove from exposure.

Skin contact: Wash off thoroughly with soap and water.

Ingestion: Wash out mouth thoroughly with water. In severe cases obtain medical attention.

5. Fire-fighting measures

Special risks:

Flammable.

Suitable extinguishing media:

Water spray, foam, dry powder or carbon dioxide

6. Accidental release measures

Shut off all sources of ignition. Wear appropriate protective clothing.

Absorb on an inert absorbent, (e.g. BDH Spillage absorption granules), transfer to a suitable container and arrange removal by disposal company. Wash site of spillage thoroughly with water and detergent.

For large spillages liquids should be contained with sand or earth and both liquids and solids transferred to salvage containers. Any residues should be treated as for small spillages.

7. Handling and storage

Handling:

Storage:

Store at room temperature (15 to 25°C recommended). Keep well closed and protected from direct sunlight and moisture.

8. Exposure controls/personal protection

As appropriate to the situation and the quantity handled.

Respirator: Self-contained breathing apparatus

Ventilation: Fume cupboard, flameproof

Gloves: Nitrile

Eye Protection: Goggles or face-shield

Other Precautions: Plastic apron, sleeves, boots - if handling large quantities

9. Physical and chemical properties

Product description	Colourless liquid, fruity odour
---------------------	---------------------------------

Melting temperature	-93°C
---------------------	-------

Boiling temperature	121°C
Density(g/ml)	0.88
Vapour pressure	n/a
-Density	n/a
Solubility in water	Practically insoluble

Flash point	26°C
Explosion limits: lower:	n/a
Auto-ignition temperature	463°C

10. Stability and reactivity

Stable.

May react with oxidising materials.

11. Toxicological information

Irritating to eyes. May irritate skin. May be harmful if ingested in large quantities.

Further data

LD50 13000 mg/kg oral, rat.

No evidence of carcinogenic properties. No evidence of mutagenic or teratogenic effects.

12. Ecological information

No environmental hazard is anticipated provided that the material is handled and disposed of with due care and attention.

13. Disposal considerations

Chemical residues are generally classified as special waste, and as such are covered by regulations which vary according to location. Contact your local waste disposal authority for advice, or pass to a chemical disposal company. Rinse out empty containers thoroughly before returning for recycling.

14. Transport information

UN-No.: 1180	IMDG class: 3.3
IMO:	Packaging group:
IATA:	Packaging group:

Correct technical name:

ADR/RID:

15. Regulatory information

Labelling according to EC directives

Symbol:

R-phrases: R10

Flammable.

S-phrases: S16

Keep away from sources of ignition - No smoking.

EC-No.:

Local Regulations

UK Exposure Limits: None assigned

16. Other information

Date of issue: 18/08/94

Date of print: 07/01/02



Material Safety Data Sheet

Catalog Number: 219203
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 219203

Product name: ETHYLCYCLOHEXANE

Supplier:

MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
ETHYLCYCLOHEXANE	1678-91-7	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable

Category of Danger:

Flammable

Principle routes of exposure: Skin

Inhalation: May cause irritation of respiratory tract

Ingestion: May be harmful if swallowed.

Skin contact: May cause allergic skin reaction

Eye contact: Avoid contact with eyes

Statements of hazard Flammable

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

Catalog Number: 219203

Product name: ETHYLCYCLOHEXANE

Page 1 of 5

EPAPA005000929

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Carbon dioxide (CO ₂), Dry chemical, Foam, Water may be ineffective.
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	238 °C (460 °F)
NFPA rating:	
NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: Breathing apparatus only if aerosol or dust is formed.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.

Eye protection: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance and Odor	Colorless
Physical state:	Liquid
Formula:	C ₈ -H ₁₆
Molecular weight:	112.21
Melting point/range:	-111 °C (-168 °F)
Boiling point/range:	132 °C (269 °F)
Catalog Number: 219203	Product name: ETHYLCYCLOHEXANE

Density:	0.792 at 20 °C (water = 1)
Vapor pressure:	26 mm Hg at 38 °C
Evaporation rate:	No data available
Vapor density:	3.9 (air = 1)
Solubility (in water):	Insoluble
Flash point:	Not determined
Autoignition temperature:	238 °C (460 °F)

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-
Conditions to avoid:	Forms explosive mixture with air. Incompatible with oxidizers, acids and caustics. Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components

ETHYLCYCLOHEXANE

RTECS Number:

Not Available

Selected LD50s and LC50s

Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutant	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
ETHYLCYCLOHEXANE	Not Listed	Not Listed	Not Listed
Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
ETHYLCYCLOHEXANE	Not Listed	Not Listed	Not Listed
Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
ETHYLCYCLOHEXANE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
ETHYLCYCLOHEXANE	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
ETHYLCYCLOHEXANE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS**Waste from residues / unused products:**

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging:

Do not re-use empty containers

14. TRANSPORT INFORMATION**UN/Id No:**

Not regulated

DOT:**Proper shipping name:**

Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
ETHYLCYCLOHEXANE	Not Listed

TDG (Canada):**WHMIS hazard class:**

Non-controlled

IMDG/IMO**IMDG - Hazard Classifications**

Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
ETHYLCYCLOHEXANE	Not Listed	Not Listed

IMO-labels:**15. REGULATORY INFORMATION****International Inventories****Components**

ETHYLCYCLOHEXANE

Inventory - United States TSCA - Sect. 8(b)

Present

Canada DSL Inventory List -

Not Listed

Canada NDSL Inventory List -

Present

Australia (AICS):

Present

Catalog Number: 219203

Product name: ETHYLCYCLOHEXANE

Page 4 of 5

EU EINECS List -
Inventory - Japan:
Korean KECL:

216-835-0; C8H16
3-2231
KE-13575

U.S. regulations:**Components**

ETHYLCYCLOHEXANE

California Proposition 65

-
Not ListedMassachusetts Right to
Know List:
[present]New Jersey Right to
Know List:
Not ListedPennsylvania Right to Know
List:
[present]**Components**

ETHYLCYCLOHEXANE

Florida substance List:

[present]

Rhode Island Right to
Know List:
Not ListedIllinois - Toxic Air
Contaminants
Not ListedConnecticut - Hazardous Air
Pollutants
Not Listed**Components**

ETHYLCYCLOHEXANE

SARA 313 Emission
reporting/Toxic Release
of Chemicals
Not ListedCERCLA/SARA - Section NTP:
302 Extremely Haz

Not Listed

None

IARC:

None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

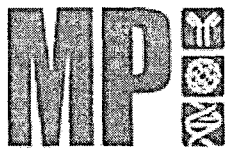
The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet



Material Safety Data Sheet

Catalog Number: 212808
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 212808

Product name: 2-ETHYLHEXANE

Synonyms: 2-Ethylhexane

Supplier:

MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
2-ETHYLHEXANE	589-81-1	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed., Harmful to flora, fauna, soil organisms and aquatic organisms., Flammable

Category of Danger:

Flammable , Dangerous for the environment , Harmful

Principle routes of exposure: Skin

Inhalation: Harmful by inhalation.

Ingestion: Harmful if swallowed.

Skin contact: Harmful in contact with skin.

Eye contact: Risk of serious damage to eyes

Statements of hazard HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.

Flammable

Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

Precautions - ANSI Label Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Inhalation: Move to fresh air. Call a physician immediately.

Skin contact: Rinse immediately with plenty of water and seek medical advice

Ingestion: Do not induce vomiting without medical advice.

Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Protection of first-aiders: No information available

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

Use dry chemical, CO₂, water spray or 'alcohol' foam.

Specific hazards:

Flammable Extremely flammable

Unusual hazards:

None known

Special protective equipment for firefighters:

Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.

Specific methods:

Water mist may be used to cool closed containers.

Flash point:

13.8°C

Autoignition temperature:

Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	3
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Remove all sources of ignition. Use personal protective equipment.

Environmental precautions:

Do not flush into surface water or sanitary sewer system.

Methods for cleaning up:

Soak up with inert absorbent material. Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:

Use only in area provided with appropriate exhaust ventilation.

Safe handling advice:

Wear personal protective equipment. Remove and wash contaminated clothing before reuse.

Technical measures/storage conditions:

Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition

Incompatible products:

Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.

Hand protection: Pvc or other plastic material gloves

Skin and body protection: Impervious clothing Long sleeved clothing

Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Formula:	C ₈ H ₁₈
Melting point/range:	No data available at this time.
Boiling point/range:	119°C
Density:	0.70582 g/ml
Vapor pressure:	No data available
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	No data available
Flash point:	13.8°C
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components

2-ETHYLHEXANE

RTECS Number:

Not Available

Selected LD₅₀s and LC₅₀s

Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
2-ETHYLHEXANE	Not Listed	Not Listed	Not Listed
Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
2-ETHYLHEXANE	Not Listed	Not Listed	Not Listed
Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
2-ETHYLHEXANE	Not Listed	Not Listed	Not Listed
Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
2-ETHYLHEXANE	Not Listed	Not Listed	Not Listed
Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants	
2-ETHYLHEXANE	Not Listed	Not Listed	

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

**Contaminated packaging:
Methods for cleaning up:**

Do not re-use empty containers
Soak up with inert absorbent material. Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: 1206

DOT:

Proper shipping name: Heptanes
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 -
Flammable liquid
Packing group: II

Emergency Response Guide Number (ERG): 128

Components U.S. DOT - Appendix A Table 1 - Reportable Quantities
2-ETHYLHEXANE Not Listed

TDG (Canada):

WHMIS hazard class: B2 flammable liquids



IMDG/IMO**Proper shipping name:**

Heptanes

IMDG - Hazard Classifications

Not Applicable

Components**U.S. DOT - Appendix B - Marine Pollutan****U.S. DOT - Appendix B - Severe Marine
Pollutants**

2-ETHYLHEXANE

Not Listed

Not Listed

IMO-labels:**15. REGULATORY INFORMATION****International Inventories****Components**

2-ETHYLHEXANE

Inventory - United States TSCA - Sect. 8(b)

Present

Canada DSL Inventory List -

Not Listed

Canada NDSL Inventory List -

C8H18

Inventory - China:

Present

EU EINECS List -

209-660-6; C8H18

Inventory - Japan:

2-8

Korean KECL:

KE-24151

U.S. regulations:**Components**

2-ETHYLHEXANE

California Proposition 65

Not Listed

Massachusetts Right to**Know List:**
Not Listed**New Jersey Right to****Know List:**
Not Listed**Pennsylvania Right to Know****List:**
Not Listed**Components**

2-ETHYLHEXANE

Florida substance List:

Not Listed

Rhode Island Right to**Know List:**
Not Listed**Illinois - Toxic Air****Contaminants**
Not Listed**Connecticut - Hazardous Air****Pollutants**
Not Listed**Components**

2-ETHYLHEXANE

**SARA 313 Emission
reporting/Toxic Release
of Chemicals**

Not Listed

CERCLA/SARA - Section 302 Extremely Haz

Not Listed

NTP:

None

IARC:

None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

1 Identification of substance:

Product details:

Product name: Ethyl formate

Stock number:

A11113
L03027

Manufacturer/Supplier:

Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency information:

During normal hours the Health, Safety and Environmental Department.
After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:

Description: (CAS#)

Ethyl formate (CAS# 109-94-4); 100%

Identification number(s):

EINECS Number: 203-721-0

EU Number: 607-015-00-7

3 Hazards identification

Hazard description:



Xn Harmful

F Highly flammable

Information pertaining to particular dangers for man and environment

R 11 Highly flammable.

R 20/22 Harmful by inhalation and if swallowed.

R 36/37 Irritating to eyes and respiratory system.

Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH	1
FIRE	2
REACTIVITY	1

Health (acute effects) = 1

Flammability = 2

Reactivity = 1

4 First aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

(Contd. on page 2)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

Product name: Ethyl formate

(Contd. of page 1)

Seek immediate medical advice.

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.**5 Fire fighting measures****Suitable extinguishing agents**

CO2, extinguishing powder or water spray. Fight larger fire with alcohol resistant foam.

Special hazards caused by the material, its products of combustion or resulting gases:

In case of fire, the following can be released:

Carbon monoxide and carbon dioxide

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures**Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Keep away from ignition sources.

Additional information:

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage**Handling****Information for safe handling:**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires:

Keep ignition sources away.

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

Gases can be produced if heated in sealed containers, causing possible rupture or explosion.

Storage**Requirements to be met by storerooms and receptacles:**

Store in a cool location.

(Contd. on page 3)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

Product name: Ethyl formate

(Contd. of page 2)

Information about storage in one common storage facility:

Do not store together with strongly basic or oxidizing materials.

Protect from heat.

Store away from water/moisture.

Further information about storage conditions:

Keep container tightly sealed.

Protect from humidity and water.

Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:*Ethyl Formate*

	ppm
ACGIH TLV	100
Austria TWA	100
Belgium TWA	100
Denmark TWA	100
Finland TWA	100; 150-STEL
France TWA	100
Germany TWA	100
Ireland TWA	100; 150-STEL
Netherlands TWA	100
Poland TWA	100
Switzerland TWA	100; 200-STEL
United Kingdom TWA	100; 150-STEL
USA PEL	100

Components with limit values that require monitoring at the workplace:

Additional information: No data

Personal protective equipment**General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Breathing equipment:

Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves**Eye protection:** Safety glasses**Body protection:** Protective work clothing.**9 Physical and chemical properties:****General Information**

Form:	Clear liquid
Color:	Colorless

(Contd. on page 4)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

Product name: Ethyl formate

(Contd. of page 3)

Odor:	Pleasant Aromatic
Change in condition	
Melting point/Melting range:	-80°C (-112°F)
Boiling point/Boiling range:	54°C (129°F)
Sublimation temperature / start:	Not determined
Flash point:	-19°C (-2°F)
Ignition temperature:	454°C (849°F)
Decomposition temperature:	Not determined
Auto igniting:	Self igniting at raised temperature.
Danger of explosion:	Product is not explosive. However, formation of explosive air/vapor mixtures is possible.
Explosion limits:	
Lower:	2.8 Vol %
Upper:	16 Vol %
Vapor pressure at 20°C (68°F):	0.0975 hPa (0 mm Hg)
Density at 20°C (68°F):	0.9170 g/cm ³
Solubility in / Miscibility with	
Water:	Fully miscible
Alcohols:	Soluble
Organic solvents:	Soluble in ether. Soluble in acetone.

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:

Decomposition will not occur if used and stored according to specifications.

Materials to be avoided:

Oxidizing agents

Bases

Heat

Water/moisture

Dangerous reactions

Unstable in the presence of bases which can lead to a vigorous reverse reaction that produces carbon monoxide gas, causing a possible explosion in a closed container.

Dangerous products of decomposition: Carbon monoxide and carbon dioxide

11 Toxicological information

Acute toxicity:

LD/LC50 values that are relevant for classification:

Oral	LD50	1110 mg/kg (gpg) 1850 mg/kg (rat) 2075 mg/kg (rbt)
Dermal	LD50	>20 mL/kg (rbt)
Inhalative	LCLo/4H	8000 ppm/4H (rat)

(Contd. on page 5)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

Product name: Ethyl formate

(Contd. of page 4)

Irritation of skin mild 460 mg (rbt)

Primary irritant effect:

on the skin: Irritant to skin and mucous membranes.

on the eye: Irritating effect.

Sensitization: No sensitizing effects known.

Other information (about experimental toxicology):

Tumorigenic effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:

Ethyl formate can irritate the eyes and, more severely, the respiratory system. Ingestion or inhalation causes somnolence, dyspnea, and gastrointestinal disturbances. Laboratory experiments show that tumors can occur when applied periodically to the skin.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:**General notes:**

Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations**Product:****Recommendation**

Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:**Recommendation:** Disposal must be made according to official regulations.**Recommended cleansing agent:** Water, if necessary with cleansing agents.**14 Transport information****DOT regulations:**

Hazard class: 3
Identification number: UN1190
Packing group: II
Proper shipping name (technical name): ETHYL FORMATE

(Contd. on page 6)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

Product name: Ethyl formate

(Contd. of page 5)

Label 3

Land transport ADR/RID (cross-border)



ADR/RID class: 3 (F1) Flammable liquids
 Danger code (Kemler): 33
 UN-Number: 1190
 Packaging group: II
 Description of goods: 1190 ETHYL FORMATE

Maritime transport IMDG:



IMDG Class: 3
 UN Number: 1190
 Label: 3
 Packaging group: II
 Proper shipping name: ETHYL FORMATE

Air transport ICAO-TI and IATA-DGR:



ICAO/IATA Class: 3
 UN/ID Number: 1190
 Label: 3
 Packaging group: II
 Proper shipping name: ETHYL FORMATE

15 Regulations

Product related hazard informations:

Hazard symbols:

Xn Harmful
 F Highly flammable

Risk phrases:

11 Highly flammable.
 20/22 Harmful by inhalation and if swallowed.
 36/37 Irritating to eyes and respiratory system.

Safety phrases:

9 Keep container in a well-ventilated place.
 16 Keep away from sources of ignition - No smoking.
 24 Avoid contact with skin.
 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 33 Take precautionary measures against static discharges.

(Contd. on page 7)

USA

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006

Reviewed on 08/07/2006

Product name: Ethyl formate

(Contd. of page 6)

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:

For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Darrell R. Sanders

USA

W

Redox Logo with tag line

MATERIAL SAFETY DATA SHEET**1. IDENTIFICATION****Product Name :** TALL OIL FATTY ACID**Other Names :** FATTY ACIDS, TALL OIL**Uses :** Used in coatings, metallurgical and pharmaceuticals.**Organisation**

Redox Pty Ltd

Location

2 Swettenham Road Minto NSW 2566 Australia

Telephone

02-97333000

Ask For

Technical Officer

Poisons Information Centre

Westmead NSW

131126

1800-251525

2. HAZARD IDENTIFICATION**NOT Hazardous according to criteria of NOHSC****Risk Phrases****Safety Phrases****ERMA New Zealand Approval Code :** No Data**HSNO Hazard Classification :** No Data

This Material Safety Data Sheet may not provide exhaustive guidance for all HSNO Controls assigned to this substance. The ERMA website www.ermanz.govt.nz should be consulted for a full list of triggered controls and cited regulations

3. COMPOSITION/INFORMATION ON INGREDIENTS**Chemical Entity**

TALL OIL FATTY ACID

CAS No.

[61790-12-3]

Proportions (%)

100

4. FIRST AID MEASURES**Description of necessary measures according to routes of exposure****Swallowed**

Drink plenty of water. Seek medical attention.

Eye

Rinse immediately with plenty of water. Seek medical attention.

Skin

Wash off immediately with soap and water. Seek medical attention.

Inhaled

Move to fresh air. If symptoms or effects persist, seek medical attention.

Advice to Doctor

Treat symptomatically based on individual reactions of patient and judgement of doctor.

Additional Information

Aggravated medical conditions caused by exposure

No information available on medical conditions aggravated from this product.

5. FIRE FIGHTING MEASURES

Extinguishing Media

In case of fire, appropriate extinguishing media include dry powder or foam.

Hazards from Combustion Products

No information available on combustion products.

Special protective precautions and equipment for fire fighters

Fire fighters should wear a self contained breathing apparatus and full protective clothing along with protective equipment.

Flammability Conditions

Combustible liquid.

Additional Information

Hazchem Code : N/A

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures

Personnel involved in the clean up should wear full protective clothing. Eliminate all sources of ignition. Increase ventilation. Avoid walking through spilled product as it may be slippery. Do NOT let product reach drains or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Authority. Use spark-proof equipment.

Methods and materials for containment and clean up

Soak up spilled product using absorbent non-combustible material such as sand or soil. Avoid using sawdust or cellulose. When saturated, collect material into suitable, labelled, dry, sealable containers and hold for safe disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures. Wash thoroughly after handling.

Conditions for safe storage, including any incompatibles

Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Inspect regularly for deficiencies such as damage or leaks. Protect against physical damage. Store away from incompatible materials. Take precautionary measures against static discharges.

Container Type

Iron drums tightly closed with inner coating with plastic.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National Exposure Standards

No exposure standard has been established for this product by the Australian National Occupational Health and Safety Commission (NOHSC). However, the exposure standard for dust not otherwise specified is 10mg/m³ (for inspirable dust) and 3mg/m³ (for respirable dust).

Biological Limit Values

No information available on biological limit values for this product.

Engineering Controls

Ensure adequate ventilation system, especially in confined areas.

Personal Protection

RESPIRATOR: Wear an effective dust mask. EYES: Safety glasses. HANDS: Gloves. CLOTHING: Lightweight protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Yellow to brown liquid
Formula	Unspecified.
Odour	odourless
Vapour Pressure	Not Applicable
Vapour Density	Not Applicable
Boiling Point	N/A deg C
Melting Point	218°C deg C
Solubility in water	Insoluble
Specific Gravity	N/A (Water = 1)
Flash Point	Open Cup 196°C
pH	5 ()
Flammability Limits (as percentage volume in air)	
Lower Explosion Limit	Not Applicable
Upper Explosion Limit	Not Applicable
Ignition Temperature	Not Applicable
Specific Heat Value	Not Applicable
Particle Size	Not Applicable
Volatile Organic Compounds (VOC) content	Not Applicable
Evaporation Rate	Not Applicable
Viscosity	Not Applicable
Percent Volatile	No Data
Octanol/Water partition coefficient	Not Applicable
Saturated Vapour Concentration	Not Applicable
Additional Characteristics	Not Applicable
Flame Propagation/Burning Rate of Solid Materials	Not Applicable
Properties of materials that may initiate or contribute to fire intensity	Not Applicable
Potential for Dust Explosion	Not applicable. Product is a liquid.
Reactions that Release Flammable Gases	Not Applicable
Fast or Intensely Burning Characteristics	Not Applicable
Non-flammables that could contribute unusual hazards to a fire	Not Applicable
Release of invisible flammable vapours and gases	No Data
Decomposition Temperature	No Data

Additional Information

Solubility: Soluble in alcohol and methyl-alcohol.

10. STABILITY AND REACTIVITY

Chemical Stability : Product is stable under normal conditions of use and storage.

Conditions to avoid : Avoid excessive heat, static discharges and high temperatures.

Incompatible Materials : Avoid oxidizing agents and ignition sources.

Hazardous Decomposition Products : Carbon monoxide and carbon dioxide.

Hazardous Reactions : Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION**Toxicity Data**

No toxicological information available for this product.

Health Effects - Acute

Swallow

No information available.

Eye

No information available.

Skin

No information available.

Inhaled

No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity : No Data

Persistence and degradability : No persistence/degradability information available on this product.

Mobility : No information available on mobility for this product.

Additional information

Environmental fate (exposure) : No information available on environmental fate for this product.

Bioaccumulative potential : No information available on bioaccumulation for this product.

13. DISPOSAL CONSIDERATIONS

Disposal

Dispose of in accordance with all local, state and federal regulations.

Special Precautions for land fill or incineration

Contact a specialist disposal company or the local waste regulator for advice.

14. TRANSPORT INFORMATION

UN No.

Shipping Name	Not Allocated
Dangerous Goods Class	
Subsidiary Risk	TALL OIL FATTY ACID
Pack Group	
Precaution for User	C.2
Hazchem Code	
	None Allocated
	None Allocated
	No Data
	N/A

15. REGULATORY INFORMATION

Poisons Code	N/A
EPG	N/A
AICS Name	FATTY ACIDS, TALL OIL
NZ Toxic Substance	N
Additional information	No Data

16. OTHER INFORMATION**Revision Date :** May 2006**Additional information****Legend to abbreviations and acronyms:**

<	less than
>	greater than
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstracts Service (Registry Number)
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
ERMA	Environmental Risk Management Authority
HSNO	Hazardous Substance and New Organism
IDLH	Immediately Dangerous to Life and Health
LC50	LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD50	LD stands for "Lethal Dose". LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals
Misc	miscible
N/A	Not Applicable
NIOSH	National Institute for Occupational Safety and Health
NOHSC	National Occupational Health and Safety Commission
OECD	Organization for Economic Co-operation and Development
PEL	Permissible Exposure Limit
RCP	Reciprocal Calculation Procedure
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
UN	United Nations (number)
cm2	square centimetres
deg C (°C)	degrees Celsius
g	gram
g/cm3	grams per cubic centimetre
g/l	grams per litre
immiscible	liquids are insoluble in each other
kg	kilogram
kg/m3	kilograms per cubic metre
ltr	Litre
m3	cubic metre
mbar	millibar
mg	milligram
mg/24H	milligrams per 24 hours
mg/kg	milligrams per kilogram
mg/m3	milligrams per cubic metre
miscible	liquids form one homogeneous liquid phase regardless of the amount of either component present
mm	millimetre
ppb	parts per billion
ppm	parts per million
ppm/2h	parts per million per 2 hours
ppm/6h	parts per million per 6 hours
tne	tonne
ug/24H	micrograms per 24 hours

wt g/L

Literature references:

No Data

Sources for data:

No Data

QEC
Logo

Respons
Care
Logo

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2

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Sydney

This MSDS summarises Redox Pty Ltd best knowledge of the health and safety hazard information of the selected substance and how to safely handle the selected substance in the workplace however Redox Pty Ltd expressly disclaims that the MSDS is a representation or guarantee of the chemical specifications for the substance. Each user should read the MSDS and consider the information in the context of how the selected substance will be handled and used in the workplace including its use in conjunction with other substances.

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Redox Logo with tag line

MATERIAL SAFETY DATA SHEET**1. IDENTIFICATION****Product Name :** FATTY ALCOHOL TECH 9/8**Other Names :** C9-C11 SYNTHETIC ALCOHOL ETHOXYLATE (C9-11) ALKYL ALCOHOL, ETHOXYLATE**Uses :** Surfactant.

Organisation	Location	Telephone	Ask For
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	02-97333000	Technical Officer
Poisons Information Centre	Westmead NSW	131126	
		1800-251525	

2. HAZARD IDENTIFICATION**Hazardous according to criteria of NOHSC**

HARMFUL; IRRITANT

Risk Phrases

R22 Harmful if swallowed.
 R41 Risk of serious damage to eyes.

Safety Phrases

S25 Avoid contact with eyes.
 S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 S37/39 Wear suitable gloves and eye/face protection.

ERMA New Zealand Approval Code : No Data**HSNO Hazard Classification :** 6.1D 6.3A 8.3A 9.1D 9.3C

This Material Safety Data Sheet may not provide exhaustive guidance for all HSNO Controls assigned to this substance. The ERMA website www.ermanz.govt.nz should be consulted for a full list of triggered controls and cited regulations

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Entity	CAS No.	Proportions (%)
ALCOHOLS, C9-11, ETHOXYLATED	[68439-46-3]	100

4. FIRST AID MEASURES**Description of necessary measures according to routes of exposure****Swallowed**

Do NOT induce vomiting. Rinse mouth out with water. Give water to drink. Seek immediate medical assistance.

Eye

Immediately flush eyes with copious amounts of water holding eyelids open. Transport to hospital or medical centre.

Skin

Remove contaminated clothing. Flush affected area with copious amounts of water. If irritation persists, seek medical assistance.

Inhaled

Remove victim from exposure to fresh air. Keep at rest until fully recovered. If rapid recovery does not occur, seek medical assistance.

Advice to Doctor

Treat symptomatically based on individual reactions of patient and judgement of doctor. Product can cause corneal burns.

Additional Information

Aggravated medical conditions caused by exposure

No information available on medical conditions aggravated from exposure to this product.

5. FIRE FIGHTING MEASURES

Extinguishing Media

In case of fire, appropriate extinguishing media include large fires - water fog, fine water spray or foam. small fires - foam, dry chemical, carbon dioxide and water spray.

Hazards from Combustion Products

This product is a combustible liquid. Heating can cause expansion or decomposition leading to violent rupture of containers. Excessive heat will lead to accelerated oxidative degradation. On burning, product will emit toxic fumes including carbon dioxide and carbon monoxide.

Special protective precautions and equipment for fire fighters

Fire fighters should wear a self contained breathing apparatus and full protective clothing along with protective equipment.

Flammability Conditions

Combustible liquid.

Additional Information

Hazchem Code : N/A

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures

Personnel involved in the clean up should wear full protective clothing. Eliminate all sources of ignition. Increase ventilation. Avoid walking through spilled product as it may be slippery. Do NOT allow product to reach drains or waterways. If product does enter a waterway advise the Environmental Protection Authority or your local Waste Authority. Use spark-proof tools and equipment.

Methods and materials for containment and clean up

Soak up spilled product using absorbent non-combustible material such as sand or soil. Avoid using sawdust or cellulose. When saturated, collect material into suitable, labelled, dry, sealable containers and hold for safe disposal. Once pick up is complete, flush the spill site with water to eliminate any residue. Hold contaminated water for treatment.

7. HANDLING AND STORAGE

Precautions for safe handling

Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures. Wash thoroughly after handling. Take precautionary measures against static discharges by bonding and grounding equipment.

Conditions for safe storage, including any incompatibles

Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Open containers slowly in order to control possible pressure release. Inspect regularly for deficiencies such as damage or leaks. Protect against physical damage. Bulk storage tanks should be diked (bunded). Use non-sparking tools and equipment. Store away from incompatible materials including oxidizing agents, acids and ignition sources. Protect from direct sunlight. This product is classified as a "C2" Combustible Liquid for the purpose of storage and handling.

Container Type

Stainless steel or mild steel vessels are recommended. Do NOT use copper or its alloys.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National sure Standards

No exposure standard has been established for this product by the Australian National Occupational Health and Safety Commission (NOHSC). However, the exposure standard for dust not otherwise specified is 10mg/m³ (for inspirable dust) and 3mg/m³ (for respirable dust).

Biological Limit Values

No biological limit allocated for this product.

Engineering Controls

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.

Personal Protection

RESPIRATOR: If inhalation risk from spray mists exists, wear an NIOSH approved half face-piece filter respirator suitable for organic particulates meeting the requirements of AS/NZS1715 and AS/NZS1716. EYES: Chemical goggles. HANDS: Impervious gloves. CLOTHING: Wear overalls and safety shoes to prevent exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	white hazy liquid
Formula	Unspecified.
Odour	mild odour
Vapour Pressure	<10Pa mm Hg (1 atmosphere)
Vapour Density	Not Applicable
Boiling Point	N/A deg C
Melting Point	13°C deg C
Solubility in water	Soluble
Specific Gravity	0.998 (Water = 1)
Flash Point	Closed Cup >184°C
pH	6-8 (1% aqueous solution)
Flammability Limits (as percentage volume in air)	
Lower Explosion Limit	Not Applicable
Upper Explosion Limit	Not Applicable
Ignition Temperature	355°C
Specific Heat Value	Not Applicable
Particle Size	Not Applicable
Volatile Organic Compounds (VOC) content	Not Applicable
Evaporation Rate	Not Applicable
Viscosity	21cP
Percent Volatile	No Data
Octanol/Water partition coefficient	Not Applicable
Saturated Vapour Concentration	Not Applicable
Additional Characteristics	Not Applicable
Flame Propagation/Burning Rate of Solid Materials	Not Applicable
Properties of materials that may initiate or contribute to fire intensity	Not Applicable
Potential for Dust Explosion	Product is a liquid.
Reactions that Release Flammable Gases	Not Applicable
Fast or Intensely Burning Characteristics	Not Applicable
Non-flammables that could contribute unusual hazards to a fire	Not Applicable
Release of invisible flammable vapours and gases	No Data
Decomposition Temperature	No Data

Additional Information

Solubility: Readily soluble in water, simple alcohols glycol ethers, esters, chlorinated solvents and many aromatic oils and solvents. Insoluble in middle distillate fractions and paraffinic oils.

10. STABILITY AND REACTIVITY

Chemical Stability : Product is stable under normal conditions of use and storage.

Conditions to avoid : Avoid excessive heat, direct sunlight, static discharges and high temperatures.

Incompatible Materials : Incompatible with oxidizing agents, acids and sources of ignition.

Hazardous composition Products : On burning, product will emit toxic fumes including carbon dioxide and carbon monoxide.

Hazardous Reactions : Product reacts with oxidizing agents. Excessive heat will lead to accelerated oxidative degradation.

11. TOXICOLOGICAL INFORMATION

Toxicity Data

Oral LD50 Rat: 1000-2700mg/Kg Eye Rabbit: Severely irritating. Environmental and Human Safety of Major Surfactants - Alcohol Ethoxylates and Alkylphenol Ethoxylates, Talmage S. Lewis Publishers 1994.

Health Effects - Acute

Swallowed

Harmful if swallowed. May cause nausea, vomiting, diarrhoea, abdominal pain and irritation of the gastro-intestinal tract.

Eye

Risk of serious damage to eyes. Severe eye irritant. Contamination of eyes can result in permanent injury. Corrosive to eyes, contact can cause cornea burns.

Skin

May result in irritation. Will have a degreasing action on the skin. Repeated/prolonged skin contact may lead to irritant contact dermatitis.

Inhaled

Not expected to cause respiratory irritation unless present as an aerosol. Inhalation of high concentrations of mist may result in respiratory irritation.

12. ECOLOGICAL INFORMATION

Ecotoxicity : No Data

Persistence and degradability : BOD 28 day/COD: 56% (OECD 301C) Dissolved Organic Carbon Removal (DOC removal): 80% (OECD 301C) This product is expected to be readily biodegradable.

Mobility : No information available on mobility for this product.

Additional information

Environmental fate (exposure) : Avoid contaminating drains, sewers and waterways.

Bioaccumulative potential : No information available on bioaccumulation for this product.

13. DISPOSAL CONSIDERATIONS

Disposal

Dispose of in accordance with all local, state and federal regulations.

Special Precautions for land fill or incineration

Product is suitable for disposal by incineration or landfill through an approved agent. Drain container thoroughly, vent in a safe place away from sparks and fire as residue may cause an explosion hazard. Do not puncture, cut or weld unclean containers. Send to drum recoverer or metal reclaimer.

14. TRANSPORT INFORMATION

UN No.

Shipping Name	Not Allocated
Dangerous Goods Class	
Subsidiary Risk	FATTY ALCOHOL TECH 9/8
Pack Group	
Precaution for User	C.2
Hazchem Code	None Allocated

None Allocated

HARMFUL; IRRITANT

N/A

15. REGULATORY INFORMATION

Poisons Schedule	N/A
EPG	N/A
AICS Name	ALCOHOLS, C9-11, ETHOXYLATED
NZ Toxic Substance	N
Additional information	No Data

16. OTHER INFORMATION

Revision Date : Sep 2005

Additional information**Legend to abbreviations and acronyms:**

<	less than
>	greater than
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstracts Service (Registry Number)
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
ERMA	Environmental Risk Management Authority
HSNO	Hazardous Substance and New Organism
IDLH	Immediately Dangerous to Life and Health
LC50	LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD50	LD stands for "Lethal Dose". LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals
Misc	miscible
N/A	Not Applicable
NIOSH	National Institute for Occupational Safety and Health
NOHSC	National Occupational Health and Safety Commission
OECD	Organization for Economic Co-operation and Development
PEL	Permissible Exposure Limit
RCP	Reciprocal Calculation Procedure
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
UN	United Nations (number)
cm2	square centimetres
deg C ('C)	degrees Celsius
g	gram
g/cm3	grams per cubic centimetre
g/l	grams per litre
immiscible	liquids are insoluble in each other
kg	kilogram
kg/m3	kilograms per cubic metre
ltr	litre

Redox Pty Ltd Material Safety Data Sheet SUFFAY30

m3	cubic metre
mbar	millibar
mg	milligram
mg/24H	milligrams per 24 hours
mg/kg	milligrams per kilogram
mg/m3	milligrams per cubic metre
miscible	liquids form one homogeneous liquid phase regardless of the amount of either component present
mm	millimetre
ppb	parts per billion
ppm	parts per million
ppm/2h	parts per million per 2 hours
ppm/6h	parts per million per 6 hours
tne	tonne
ug/24H	micrograms per 24 hours
wt	weight

Literature references:

No Data

Sources for data:

No Data



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Melbourne Hawkes Bay

Australia www.redox.com Perth sydney@redox.com Sydney

This MSDS summarises Redox Pty Ltd best knowledge of the health and safety hazard information of the selected substance and how to safely handle the selected substance in the workplace however Redox Pty Ltd expressly disclaims that the MSDS is a representation or guarantee of the chemical specifications for the substance. Each user should read the MSDS and consider the information in the context of how the selected substance will be handled and used in the workplace including its use in conjunction with other substances.

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FEED STOCK

Petroleum Distillates/Fuel blendstock MSDS No. MI 160

Revision: 0



Date: 2/20/03

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Petroleum distillate/fuel blendstock

Chemical Formula: Mixture

CAS Number: Mixture

Synonyms:

General Use: fuel blendstock

Manufacturer: KMCO, LP 16503 Ramsey Road, Crosby, Texas 77532, Phone (281) 328-3501, FAX (281) 328-9528

24-HOUR EMERGENCY NUMBER: CHEMTREC 1-800-424-9300

Section 2 - Composition / Information on Hazardous Ingredients

Ingredient Name	CAS Number		% wt or % vol	
Ethanol	64-17-5		0 - 90 %	
Toluene	108-88-3		0 - 90 %	
Petroleum distillates (lube, mineral oil), (naptha)	8002-05-9		0 - 90 %	
Mixed xylenes	1330-20-7		0 - 90 %	
Water			0 - 50 %	

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH IDLH
	TWA	STEL	TWA	STEL	TWA	STEL	
Ethanol	1000 ppm	None estab	1000 ppm	None estab	1000 ppm	None estab	3300 ppm
Petroleum distillate	500 ppm	None estab	None estab	None estab	None estab	None estab	
Xylene	100 ppm	None estab	100 ppm	150 ppm	100 ppm	150 ppm	None estab
Toluene	100 ppm	None estab	1090 ppm	None estab	100 ppm	None estab	500 ppm
Water	None estab	None estab	None estab	None estab	None estab	None estab	None estab

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆
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H 2
F 3
R 0

Potential Health Effects

Acute Effects

Inhalation: Vapors can be irritating to eyes, nose and respiratory tract.

Eye: May be mildly irritating to the eyes.

Skin: Liquid is moderately irritating to the skin and could cause dry skin and dermatitis.

Ingestion: Moderately toxic. Can cause CNS depression, nausea, dizziness, vomiting and unconsciousness.

Carcinogenicity:

Medical Conditions Aggravated by Long-Term Exposure: May aggravate an existing dermatitis, throat or respiratory condition.

Chronic Effects: No adverse effects anticipated from available information.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, Get medical attention.

Skin Contact: Remove contaminated clothing and wash affected skin area thoroughly with soap and water. If skin irritation develops or persists, seek medical attention. Dispose of contaminated clothing in compliance with Federal, State, and local regulations.

Ingestion: Induce vomiting. Get medical attention.

After first aid, get appropriate in-plant, paramedic, or community medical support.

MATERIAL SAFETY DATA SHEET

EPAPA005000959

Notes to Physicia
Safety Procedures:

KMCO

Section 5 - Fire-Fighting Measures

Flash Point: 80 - 140 °F Flash Point Method:

Burning Rate: Not Determined

Autoignition Temperature: Not Determined.

LEL: Not Determined.

UEL: Not Determined.

Flammability Classification: Severe fire hazard when exposed to heat or flame

Extinguishing Media: Foam, Dry Chemical, Carbon Dioxide, Water Fog

Unusual Fire or Explosion Hazards: Dangerous when exposed to heat or flame. Can react with oxidizing materials.

Hazardous Combustion Products: Carbon monoxide, carbon dioxide, and unidentified organic compounds

Fire-Fighting Instructions: Use waterspray to cool surfaces. Do not use direct water stream to extinguish fires. Product may travel with water and reignite.

Fire-Fighting Equipment: Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in pressure demand or other positive pressure mode.



Section 6 - Accidental Release Measures

Spill /Leak Procedures: Remove all ignition sources, safely shut off source and contain spilled material. Use protective equipment in emergency and cleanup situations. Restrict water use during cleanup.

Small Spills: Contain with inert absorbent.

Large Spills

Containment: Use explosion proof pump to recover liquid. Spilled material and contaminated water or soil may be hazardous to human or other life forms.

Cleanup: Spilled material becomes a hazardous waste. Material must be disposed of in accordance with all Federal, State, and Local regulations.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Handle material in a well-ventilated area to minimize potential exposure hazard.

Storage Requirements: Store out of direct sunlight and in a cool well-ventilated area.

Regulatory Requirements:

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Controls should be such that adequate ventilation is provided.

Ventilation: Provide general or local exhaust ventilation systems. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Normal industrial requirements should be in place.

Respiratory Protection: Air-purifying respirator can be used in a well-ventilated environment where exposure above PEL/TLV is unlikely. If working in an enclosed area approved supplied air or self-contained breathing apparatus (SCBA) should be used.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

KMCO**Section 9 - Physical and Chemical Properties**

Physical State: Liquid
Appearance and Odor: Liquid with typical odor
Odor Threshold: Not determined
Vapor Pressure: 0.01- 2.5 @ 20°C
Vapor Density (Air=1): Not determined
Formula Weight: Not applicable - mixture
Density: 6.7 - 9.0 lbs/gallon
Specific Gravity (H₂O=1, at 20/20 °C): 0.8 - 1.1 @ 25°C
pH: Not determined

Water Solubility: Not determined
Other Solubilities: Not determined
Boiling Point: 100 - 200 @ 220 MM Hg, typical
Freezing/Melting Point: approx. - 40°C
Viscosity: 1 - 15 st @ 40°C
Refractive Index: Not determined
Surface Tension: Not determined
% Volatile: Not determined
Evaporation Rate (BuAc=1): Not Determined

Section 10 - Stability and Reactivity

Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Polymerization: Will not occur.
Chemical Incompatibilities: Strong oxidizing agents, strong bases
Conditions to Avoid: Heat and flame, ignition sources, incompatibilities
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, steam and other unidentified organics.

Section 11 - Toxicological Information**Toxicity Data:***

Eye Effects: Mildly to severely irritating to eyes
Skin Effects: Mildly irritating to skin
Inhalation: Can cause headache, drowsiness,
Fatigue
Ingestion: Can cause liver and kidney damage

Acute Inhalation Effects: Can cause liver and kidney damage
Acute Oral Effects: Can cause liver and kidney damage
Chronic Effects: Repeated small exposure via any means can cause
severe kidney problems. Skin allergy can develop.
Carcinogenicity: Not classifiable as a human carcinogen
Mutagenicity:
Teratogenicity:

* See NIOSH, RTECS, for additional toxicity data.

Section 12 - Ecological Information

Ecotoxicity: Data not available.
Environmental Fate: Data not available.
Environmental Degradation: Data not available.
Soil Absorption/Mobility: Data not available.

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
Disposal Regulatory Requirements: Consult current Federal, state, and local regulations.
Container Cleaning and Disposal: Dispose of container and unused contents in accordance with Federal, state, and local requirements.

Section 14 - Transport Information**DOT Transportation Data (49 CFR 172.101):**

Shipping Name: Flammable,
liquid, n.o.s. (contains petroleum
distillate)
Shipping Symbols:
Hazard Class: 3
ID No.: NA 1993
Packing Group: 3
Label: Flammable Liquid
Special Provisions (172.102):

Packaging Authorizations
a) Exceptions:
b) Non-bulk Packaging:
c) Bulk Packaging:

Quantity Limitations
a) Passenger, Aircraft, or Railcar:
b) Cargo Aircraft Only:

Vessel Stowage Requirements
a) Vessel Stowage:
b) Other:

**Section 15 - Regulatory Information**

CFR CLP Reportable Quantity (RQ): Toluene-1000 lbs. Mixed xylenes - 100 lbs.

SARA 311/312 Codes: Toluene, Xylene

SARA Toxic Chemical (40 CFR 372.65):

SARA EHS (Extremely Hazardous Substance) (40 CFR 355):

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Xylene

OSHA Specifically Regulated Substance (29CFR 1910):

Section 16 - Other Information

Prepared By: KMCO,LP.

Revision Notes: New MSDS.

Additional Hazard Rating Systems: None

Disclaimer: This product is FOR INDUSTRIAL USE ONLY. KEEP OUT OF REACH OF CHILDREN. DO NOT TAKE INTERNALLY.

KMCO, LP. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. No warranty of fitness for any particular purpose, warranty of merchantability, or any other warranty expressed or implied, is made concerning the information provided herein. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and of the information referred to herein are beyond the control of KMCO,LP., KMCO, LP. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

For additional product information, please contact the KMCO, LP., Sales Office at 281-885-1234.

**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

FERRIC NITRATE**1. Product Identification**

Synonyms: Nitric acid, iron (3+) salt nonahydrate; iron nitrate nonahydrate; iron trinitrate
CAS No: 10421-48-4 (Anhydrous) 7782-61-8 (Nonahydrate)
Molecular Weight: 404.00
Chemical Formula: $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$
Product Codes: J.T. Baker:
2018
Mallinckrodt:
5032, 5657

2. Composition/Information on Ingredients

Ingredient	CAS No.	Percent	Hazardous
Ferric Nitrate	10421-48-4	90 - 100%	Yes

3. Hazards Identification**Emergency Overview**

DANGER! OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE LIVER.

J.T. Baker SAF-T-DATA™ Ratings

(Provided here for your convenience)

Health:	Flammability:	Reactivity:	Contact:
2 - Moderate	0 - None	3 - Severe (Oxidizer)	2 - Moderate
Lab Protection Equip:	GOGGLES; LAB COAT; PROPER GLOVES		
Storage Color Code:	Yellow (Reactive)		

Potential Health Effects**Inhalation:**

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.

Ingestion:

Causes irritation to the gastrointestinal tract. Repeated large doses can cause excess iron buildup in the body. Symptoms include gastrointestinal irritation, with abdominal cramps, vomiting, diarrhea, black stool and liver damage.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain.

Eye Contact:

Causes irritation, redness, and pain. Prolonged contact may cause a brownish discoloration to the eye.

Chronic Exposure:

Under some circumstances methemoglobinemia occurs in individuals when the nitrate is converted by bacteria in the stomach to nitrite. Chronic exposure may cause liver effects.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Fire may produce poisonous or irritating gases.

Explosion:

Contact with oxidizable substances may cause extremely violent combustion. Sealed containers may rupture when heated. Sensitive to mechanical impact.

Fire Extinguishing Media:

Dry chemical, foam, carbon dioxide, or water spray.

Special Information:

Wear full protective clothing and breathing equipment for high-intensity fire or potential explosion conditions.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.

Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Separate from combustibles, organic or other readily oxidizable materials. Avoid storage on wood floors. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits

-ACGIH Threshold Limit Value (TLV):
1 mg/m³ (TWA) soluble iron salt as Fe

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirator (NIOSH Approved)

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear protective gloves and clean body-covering clothing.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Violet crystals.

Odor:

Slight nitric acid odor.

Solubility:

Freely soluble.

Specific Gravity:

1.684

pH:

No information found.

% Volatiles by volume @ 21°C (70°F)

0

Boiling Point:

< 100°C (< 212°F) Decomposes.

Melting Point:

47.2°C (117°F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products

Emits nitrous oxides when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Substance may react violently with some organic compounds or reducing agents.

Conditions to Avoid:

Heat, shock, friction, incompatibles.

11. Toxicological Information

Oral rat LD50: 3250 mg/kg

Cancer Lists**---NTP Carcinogen---****Ingredient**

Ferric Nitrate (10421-48-4)

Known

No

Anticipated

No

IARC Category

None

12. Ecological Information**Environmental Fate:**

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations.

Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information**Domestic (Land, D.O.T.)****Proper Shipping Name:** FERRIC NITRATE**Hazard Class:** 5.1**UN/NA:** UN1466**Packing Group:** III**Information reported for product/size:**

12KG

International (Water, I.M.O.)**Proper Shipping Name:** FERRIC NITRATE**Hazard Class:** 5.1**UN/NA:** UN1466**Packing Group:** III**Information reported for product/size:**

12KG

15. Regulatory Information**Chemical Inventory Status****Ingredient**

Ferric Nitrate (10421-48-4)

TSCA

Yes

EC

Yes

Japan

Yes

Australia

Yes

Korea

Yes

---Canada---**DSL**

Yes

NDSL

No

Phl.

Yes

Federal, State & International Regulations**Ingredient**

Ferric Nitrate (10421-48-4)

---SARA 302---**RQ**

No

TPQ

No

-----SARA 313-----**List**

No

Chemical Catg.

Nitrate Cmpd.

-RCRA-**261.33**

1000

No

-TSCA-**8(d)**

No

Chemical Weapons Convention: No **TSCA 12(b):** No **CDTA:** No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No Reactivity: Yes (Mixture / Solid)
Australian Hazchem Code 1[T] **Australian Poison Schedule:** None allocated.
WHMIS: This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings:

Health: 1 Flammability: 0 Reactivity: 1 Other: Oxidizer

Label Hazard Warning:

DANGER! OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE LIVER.

Label Precautions:

Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep from contact with clothing and other combustible materials.
Wash thoroughly after handling.
Store in a tightly closed container.
Use only with adequate ventilation.
Remove and wash contaminated clothing promptly.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

No changes.

Disclaimer:

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Prepared By Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA



SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: FUEL OIL

SYNONYMS: Used oil fuel.

PRODUCT CODE: Prefix 07FO

PRODUCT USE: Fuel oil for industrial boilers. If this product is used in combination with other products, refer to the Material Safety Data Sheet for those products.

This number is for emergency use only. If you desire non-emergency product information, please call a phone number listed below.

**24-HOUR EMERGENCY PHONE NUMBER
MEDICAL AND TRANSPORTATION (SPILL):**

1-800-468-1760

SUPPLIER: Safety-Kleen Systems, Inc.
5400 Legacy Drive
Cluster II, Building 3
Plano, Texas 75024
USA
1-800-669-5740
www.Safety-Kleen.com

TECHNICAL INFORMATION: 1-800-669-5740 Press 1 then 1, then Extension 7500

MSDS FORM NUMBER: 82430

ISSUE: May 10, 2006

ORIGINAL ISSUE: October 31, 1998

SUPERSEDES: January 23, 2003

PREPARED BY: Product MSDS Coordinator

APPROVED BY: MSDS Task Force

FUEL OIL

MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

WT%	NAME	SYNONYM	CAS NO.	OSHA PEL**		ACGIH TLV®		LD ^a	LC ^b
				TWA	STEL	TWA	STEL		
65 to 100*	Used oil	N.Av.	N.Av.	mg/m ³ 5 ^c	N.Av.	mg/m ³ 5 ^c	mg/m ³ 10 ^c	N.Av.	N.Av.
0 to 25*	Water/Solids	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.
0 to 10*	Hydrocarbon solvents. May include gasoline, diesel fuel, jet fuel, mineral spirits, etc.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.
0 to 1.5*	Metals. May include lead, iron, zinc, copper, chromium, arsenic, nickel, and others: each below 1.0 WT%.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.
0 to 1.0*	Polynuclear aromatics. May include naphthalene, fluoranthene, phenanthrene, pyrene, and others: each below 0.3 WT%.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.	N.Av.

*Even though the concentration range does not fall under the ranges prescribed by WHMIS, this is the actual range which varies with each batch of the product.

N. Av. = Not Available

^aOral-Rat LD₅₀

^bInhalation-Rat LC₅₀

^cBased on Stoddard Solvent

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE

Thick black, viscous liquid with a petroleum odor.

WARNING!

PHYSICAL HAZARDS

Combustible liquid and vapor.

HEALTH HAZARDS

May be harmful if inhaled.

May be harmful if swallowed.

May be harmful if absorbed through the skin.

May irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

May cause skin sensitization.

Suspect cancer hazard. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Contains material which can cause birth defects.

Contains material which can cause central nervous system damage.

ENVIRONMENTAL HAZARDS

Components may be harmful to aquatic life.

POTENTIAL HEALTH EFFECTS

INHALATION (BREATHING): High concentrations of vapor may be harmful if inhaled. High concentrations of vapor or mist may irritate the respiratory tract (nose, throat, and lungs). High concentrations of vapor or mist may cause nausea, vomiting, headaches, dizziness, loss of coordination, numbness, and other central nervous system effects. Massive acute overexposure may cause rapid central nervous system depression, sudden collapse, coma, and/or death.

EYES: May cause irritation.

SKIN: May cause skin sensitization. May cause irritation. May be absorbed through the skin and cause harm as noted under **INHALATION (BREATHING)**.

INGESTION (SWALLOWING): May be harmful if swallowed. May cause throat irritation, nausea, vomiting, and central nervous system effects as noted under **INHALATION (BREATHING)**. Breathing product into the lungs during ingestion or vomiting may cause lung injury and possible death.

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing respiratory tract (nose, throat, and lungs), central nervous system, kidney, eye, and/or skin disorders may have increased susceptibility to the effects of exposure.

CHRONIC: Prolonged or repeated inhalation may cause toxic effects as noted under **INHALATION (BREATHING)**. Prolonged or repeated exposure may cause oil pneumonia, lung tissue inflammation, fibrous tissue formation, and central nervous system, liver and kidney damage, and may cause mutagenicity, reproductive toxicity, teratogenicity and birth defects. Prolonged or repeated eye contact may cause inflammation of the membrane lining the eyelids and covering the eyeball (conjunctivitis). Prolonged or repeated skin contact may cause drying, cracking, redness, itching, and/or swelling (dermatitis).

CANCER INFORMATION: This product contains mineral oils, untreated or mildly treated, which can cause cancer. This product may contain hydrocarbon and chlorinated solvents, metals, and polynuclear aromatics which can cause cancer. Risk of cancer depends on duration and level of exposure. For more information, see **SECTION 11: CARCINOGENICITY**. Also see **SECTION 15: CALIFORNIA**.

POTENTIAL ENVIRONMENTAL EFFECTS

Components may be toxic to aquatic life. Also see **SECTION 12: ECOLOGICAL INFORMATION**.

SECTION 4: FIRST AID MEASURES

INHALATION (BREATHING): Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Oxygen should only be administered by qualified personnel. Someone should stay with victim. Get medical attention if breathing difficulty persists.

EYES: If irritation or redness from exposure to vapor develops, move away from exposure into fresh air. Upon contact, immediately flush eyes with plenty of lukewarm water, holding eyelids apart, for 15 minutes. Get medical attention.

SKIN: Remove affected clothing and shoes. Wash skin thoroughly with soap and water. Get medical attention if irritation or pain develops or persists. Wash contaminated clothing before reuse.

INGESTION (SWALLOWING): Do NOT induce vomiting. Immediately get medical attention. Call 1-800-468-1760 for additional information. If spontaneous vomiting occurs, keep head below hips to avoid breathing the product into the lungs. Never give anything by mouth to an unconscious person.

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

NOTE TO PHYSICIANS: Treat symptomatically and supportively. Treatment may vary with condition of victim and specifics of incident. Call 1-800-468-1760 for additional information.

SECTION 5: FIRE FIGHTING MEASURES
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FLASH POINT: 180°F (82°C) Closed Cup

FLAMMABLE LIMITS IN AIR: **LOWER:** Not available **UPPER:** Not available

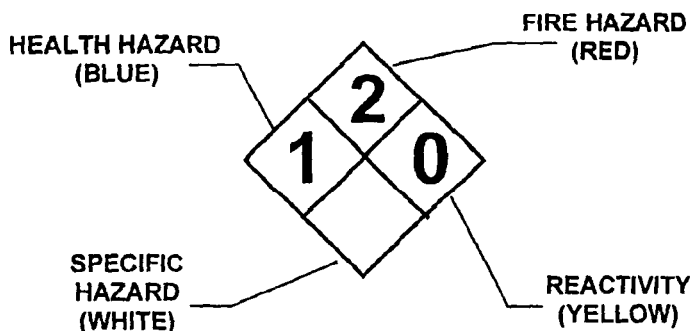
AUTOIGNITION TEMPERATURE: Not available

HAZARDOUS COMBUSTION PRODUCTS: Decomposition and combustion materials may be toxic. Burning may produce phosgene gas, nitrogen oxides, carbon monoxide and unidentified organic compounds.

CONDITIONS OF FLAMMABILITY: Heat, sparks, or flame.

EXTINGUISHING MEDIA: Carbon dioxide, regular foam, dry chemical, water spray, or water fog.

NFPA 704 HAZARD IDENTIFICATION: This information is intended solely for the use by individuals trained in this system.



FIRE FIGHTING INSTRUCTIONS: Keep storage containers cool with water spray. A positive-pressure, self-contained breathing apparatus (SCBA) and full-body protective equipment are required for fire emergencies.

FUEL OIL

MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

FIRE AND EXPLOSION HAZARDS:

Vapor explosion hazard indoors, outdoors, or in sewers. Vapors may travel to ignition source and flashback. Vapors will spread along the ground and collect in low or confined areas. Run-off to sewer may create a fire hazard. Heated containers may rupture or be thrown into the air. "Empty" containers may retain residue and can be dangerous. Product is not sensitive to mechanical impact or static discharge.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Remove all ignition sources. Do not touch or walk through spilled product. Stop leak if you can do it without risk. Wear protective equipment and provide engineering controls as specified in **SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area and avoid breathing vapor or mist. A vapor suppressing foam may be used to reduce vapors. Contain spill away from surface water and sewers. Contain spill as a liquid for possible recovery, or sorb with compatible sorbent material and shovel with a clean, sparkproof tool into a sealable container for disposal.

Additionally, for large spills: Water spray may reduce vapor, but may not prevent ignition in closed spaces. Dike far ahead of liquid spill for collection and later disposal.

SECTION 7: HANDLING AND STORAGE

HANDLING:

Keep away from heat, sparks, or flame. Where flammable mixtures may be present, equipment safe for such locations should be used. Use clean, sparkproof tools and explosion-proof equipment. When transferring product, metal containers, including trucks and tank cars, should be grounded and bonded. Do not breathe vapor or mist. Use in a well ventilated area. Avoid contact with eyes, skin, clothing, and shoes. Do not smoke while using this product.

SHIPPING AND STORING:

Keep container tightly closed when not in use and during transport. Store containers in a cool, dry place. Do not pressurize, cut, weld, braze, solder, drill, or grind containers. Keep containers away from heat, flame, sparks, static electricity, or other sources of ignition. Empty product containers may retain product residue and can be dangerous.

See **SECTION 14: TRANSPORTATION INFORMATION** for Packing Group information.

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general ventilation needed to maintain concentration of vapor or mist below applicable exposure limits. Where adequate general ventilation is unavailable, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below applicable exposure limits. Where explosive mixtures may be present, equipment safe for such locations should be used.

PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION: Use NIOSH-certified P- or R- series particulate filter and organic vapor cartridges when concentration of vapor or mist exceeds applicable exposure limits. Protection provided by air purifying respirators is limited. Do not use N-rated respirators. Selection and use of respiratory protective equipment should be in accordance in the USA with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4.

EYE PROTECTION: Wearing chemical goggles is recommended. Contact lens use is not recommended without eye protection.

SKIN PROTECTION: Where skin contact is likely, wear chemical impervious protective gloves; use of natural rubber (latex) or equivalent gloves is not recommended.

To avoid prolonged or repeated contact with product where spills and splashes are likely, wear appropriate chemical-resistant faceshield, boots, apron, whole body suits or other protective clothing.

PERSONAL HYGIENE: Use good personal hygiene. Wash thoroughly with soap and water after handling product and before eating, drinking, or using tobacco products. Clean affected clothing, shoes, and protective equipment before reuse. Discard affected clothing, shoes, and/or protective equipment if they cannot be thoroughly cleaned. Discard leather articles, such as shoes, saturated with this product.

OTHER PROTECTIVE EQUIPMENT: Where spills and splashes are likely, facilities storing or using this product should be equipped with an emergency eyewash and shower, both equipped with clean water, in the immediate work area.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE,
APPEARANCE, AND ODOR:**

Thick black, viscous liquid with a petroleum odor.

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

ODOR THRESHOLD: Not available.

MOLECULAR WEIGHT: Not available.

SPECIFIC GRAVITY: 0.8 to 1.0 (water = 1) @ 60°F (16°C)

DENSITY: 6.7 to 8.3 LB/US gal (800 to 1000 g/l)

VAPOR DENSITY: Not available.

VAPOR PRESSURE: Not available.

BOILING POINT: Not available.

FREEZING/MELTING POINT: Not available.

pH: Not applicable.

EVAPORATION RATE: Less than 1 (Butyl acetate = 1)

SOLUBILITY IN WATER: Slight.

FLASH POINT: 180°F (82°C) Closed Cup

FLAMMABLE LIMITS IN AIR: **LOWER:** Not available **UPPER:** Not available

AUTOIGNITION TEMPERATURE: Not available

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressures. Avoid heat, sparks, or flame.

INCOMPATIBILITY: Avoid acids, alkalies, oxidizing agents, reducing agents, reactive metals or reactive halogens.

REACTIVITY: Polymerization is not known to occur under normal temperature and pressures. Not reactive with water.

HAZARDOUS DECOMPOSITION PRODUCTS: None under normal temperatures and pressures. See also **SECTION 5: HAZARDOUS COMBUSTION PRODUCTS.**

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 11: TOXICOLOGICAL INFORMATION
--

SENSITIZATION: Based on best current information, there may be known human sensitization associated with this product.

MUTAGENICITY: Based on best current information, there may be known mutagenicity associated with this product.

CARCINOGENICITY: Mineral oils, untreated or mildly treated are categorized by IARC as carcinogenic to humans (Group 1). Mineral oils, untreated or mildly treated are listed by NTP as having limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals. There may be hydrocarbon and chlorinated solvents, metals, and polynuclear aromatics present in this product which are listed by OSHA as carcinogens. There may be hydrocarbon and chlorinated solvents, metals, and polynuclear aromatics present in this product which are categorized by IARC as carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), and/or possibly carcinogenic to humans (Group 2B). There may be hydrocarbon and chlorinated solvents, metals, and polynuclear aromatics present in this product which are classified by NTP as known carcinogens and/or as having limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals. There may be hydrocarbon and chlorinated solvents, metals, and polynuclear aromatics present in this product which are recognized by ACGIH as confirmed human carcinogens (A1) and/or suspected human carcinogens (A2).

Also see **SECTION 15: CALIFORNIA.**

REPRODUCTIVE TOXICITY: Based on best current information, there may be known reproductive toxicity associated with this product.

TERATOGENICITY: Based on best current information, there may be known teratogenicity associated with this product.

TOXICOLOGICALLY SYNERGISTIC PRODUCT(S): Based on best current information, there may be known toxicologically synergistic products associated with this product.

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY: Components of this product may be harmful to aquatic life.

**OCTANOL/WATER
PARTITION COEFFICIENT:** Not available.

**VOLATILE ORGANIC
COMPOUNDS:** 56 WT%; <500 g/L (calculated)
As per 40 CFR Part 51.100(s).

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL: Dispose in accordance with federal, state, provincial, and local regulations. Regulations may also apply to empty containers. The responsibility for proper waste disposal lies with the owner of the waste. Contact Safety-Kleen regarding proper recycling or disposal.

**USEPA WASTE
CODE(S):** Based on available data, this information applies to the product as supplied to the user. Processing, use, or contamination by the user may change the waste code applicable to the disposal of this product.

SECTION 14: TRANSPORT INFORMATION

DOT: Shipping Name: Combustible Liquid, n.o.s (Petroleum Oil)
UN/NA #: NA1993 Hazard Class: Combustible Liquid Packing Group: III
Required Label(s): None
Additional Info.: Non-bulk packages may be reclassified as Not Regulated.

TDG: Shipping Name: Not regulated as a Dangerous Good.

**EMERGENCY RESPONSE
GUIDE NUMBER:** 128
Reference *North American Emergency Response Guidebook*

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 15: REGULATORY INFORMATION

USA REGULATIONS

SARA SECTIONS 302 AND 304: Based on the ingredients listed in **SECTION 2**, this product does may contain" extremely hazardous substances" listed pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) Section 302 or Section 304 as identified in 40 CFR Part 355, Appendix A and B.

SARA SECTIONS 311 AND 312: This product poses the following health hazards as defined in 40 CFR Part 370 and is subject to the requirements of sections 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA):
Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard
Fire Hazard

SARA SECTION 313: This product may contain "toxic" chemicals subject to the requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372.

CERCLA: Based on the ingredients listed in **SECTION 2**, this product may contain any "hazardous substances" listed pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) in 40 CFR Part 302, Table 302.4.

TSCA: Not available.

CALIFORNIA: This product is not for sale or use in the State of California.

CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all information required by the CPR.

WHMIS: Class B3 - Combustible Liquid
Class D2A - Chronic toxic effects.
Class D2B - Irritating to eyes and skin.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): Not available.

FUEL OIL
MATERIAL SAFETY DATA SHEET FOR USA AND CANADA

SECTION 16. OTHER INFORMATION

REVISION INFORMATION: Regulatory update. Updated in Sections 1 (Dates), 3 (Emergency Overview), 4 (Phone Numbers), 8 (Personal Protective Equipment), 12 (Ecotoxicity Information), 13 (Disposal Considerations), 16 (Revision Information).

LABEL/OTHER INFORMATION: Not available.

User assumes all risks incident to the use of this (these) product(s). To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet apply to the product(s) as supplied to the user.



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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Petersburg Oil Terminal

Refinery's identification: Novokuybyshevsk refinery, Syzran refinery, Orsk refinery, Salavat refinery, Moscow refinery, Nizhnekamsk refinery, Norsi refinery, Perm refinery, Samara refinery.

Product Name: Fuel Oil No. 6

(Straight Run Atmospheric Residual Oil) Last Revision: 03/22/00

MSDS Number: A0007b.msds

Date Prepared: 09/01/06

Synonyms: M100, M40, E-4

Product Description: A complex mixture of paraffinic, olefinic, naphthenic and aromatic hydrocarbons.

2. COMPOSITION & INFORMATION ON INGREDIENTS

Occupational Exposure Limits*

OSHA ACGIH

Product	CAS No.	Wt%	PEL	TLV	Other Units
Fuel Oil No. 6	68333-00-4	100	N/A	N/A	(Straight Run Atmospheric Residual Oil)

Component(s)

Hydrogen Sulfide	7783-06-4	0-0.04	10	10	15 STEL	ppm
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CAUTION! Under certain circumstances sulfur compounds in hot product may form hydrogen sulfide (H₂S). Cooling product may continue to emit traces of H₂S temporarily entrapped or other dissolved gases.

Key: * = 8-Hr. TWA unless otherwise specified
STEL = Short Term Exposure Limit; 15 minutes.
N/A = Not Applicable

3. HAZARD IDENTIFICATION

Note: This product has not been tested by El Paso Corporation to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Carcinogenicity:	NTP	IARC Monographs	OSHA Regulated
Fuel Oil No. 6	No	2B*	No
Hydrogen Sulfide	No	No	No

5 MEZHEVOY CANAL, ST. PETERSBURG 198035, RUSSIA tel. + 7(812) 329 29 99 fax + 7(812) 329 29 89 e-mail: pnt@mar.wplus.net www.oilterminal.ru



"2B*" = This product mixture (heavy residual fuel oils) has been classified by IARC as "possibly carcinogenic to humans".

Potential Health Effects From Overexposure:

Acute Effects:

- Eyes:** Slight to moderate eye irritation.
- Skin:** Moderately irritating; causing redness, drying and cracking of skin.
- Inhalation:** Inhalation can be irritating to the mucous membrane and respiratory tract. May produce symptoms of intoxication such as; headache, dizziness, nausea, vomiting, loss of coordination. Hydrogen sulfide can cause headache, dizziness, respiratory paralysis, unconsciousness and/or death.
- Ingestion:** Ingestion may cause gastrointestinal disturbances such as nausea, vomiting and diarrhea.

Chronic Effects:

Prolonged and repeated skin contact may cause dermatitis.

Additional Medical and Toxicological Information:

May aggravate pre-existing dermatitis. This product contains polynuclear aromatics, which have caused carcinogenic effects in laboratory animals.

4. FIRST AID MEASURES

- Eye Contact:** Immediately flush with large amounts of water for at least 15 minutes, including under the eyelids. Contact a physician immediately, preferably an ophthalmologist. Speed and thoroughness in rinsing eyes are important to avoid permanent injury.
- Skin Contact:** Cool the exposed area immediately. Remove contaminated clothing. Wash affected areas with soap and water, get medical attention.
- Inhalation:** Remove to fresh air. If breathing has stopped, apply artificial respiration. Seek medical attention.
- Ingestion:** Do not induce vomiting. If spontaneous vomiting occurs, hold the victim's head lower than their hips to prevent aspiration.



5. FIRE FIGHTING MEASURES

Flash Point: >150°F

Flammable Limits in Air, % by Volume:

Lower: N/A

Upper: N/A

Autoignition Temperature: N/A

Extinguishing Media: Dry chemical, foam, carbon dioxide, and water spray.

NFPA Ratings: Health: 0 Flammability: 2 Reactivity: 0

General Hazard:

Flowing oil can be ignited by self-generated static electricity; check for combustible vapors prior to and during welding and torch cutting on tanks and vessels.

Fire Fighting Instructions:

Use a water spray to cool fire-exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a force water stream directly on oil fires as this will tend to scatter the fire. Firefighters should wear self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE

Remove source of heat or ignition including internal combustion engines and power tools. Clean up spill, but do not flush to sewers or surface water. Ventilate area and avoid breathing.

7. HANDLING & STORAGE

Store away from incompatible materials. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self-closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame sparks or other sources of ignition; they may explode and cause injury or death.

Additional Storage Warning: Hydrogen sulfide and other relatively low flash point substances may accumulate in vapor spaces of fuel oil tanks and bulk transport compartments. This not only poses an additional physical hazard (e.g., flammability) but also a potentially serious health hazard as well, due to the toxicity of hydrogen sulfide.

8. EXPOSURE CONTROL, PERSONAL PROTECTION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur. Launder contaminated clothing prior to reuse. Wash with soap and water before eating, drinking or smoking.

Inhalation: Use approved respiratory protective equipment for cleaning large spills or entry into tanks, vessels or other confined spaces.

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P E T E R S B U R G
OIL TERMINAL

Ventilation: Provide adequate general and local ventilation: (1) to maintain airborne chemical concentrations below applicable exposure limits, (2) to prevent accumulation of flammable vapors and formation of explosive atmospheres, and (3) to prevent formation of oxygen deficient atmospheres, especially in confined spaces. [Note: this product may release gases or vapors that can displace oxygen in enclosed areas.]

9. PHYSICAL & CHEMICAL PROPERTIES

See certificate of quality №456 dd 09/30/06

Odor: Mild petroleum

Appearance: Black viscous liquid

10. STABILITY & REACTIVITY

Stability: Stable under normal conditions of use.

Hazardous Polymerization: Will not occur.

Conditions to Avoid/Incompatibilities: Strong oxidizing agents, heat, sparks, flame and build up of static electricity.

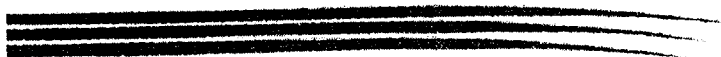
Hazardous Decomposition Products: CO, CO₂, SO₂, H₂S, and reactive hydrocarbons.

11. TOXICOLOGICAL INFORMATION

No data available.

12. ECOLOGICAL INFORMATION

No data available.





13. DISPOSAL INFORMATION

Dispose through a licensed waste disposal company. Follow applicable federal, state and local disposal regulations.

14. TRANSPORT INFORMATION

Fuel Oil, 3, NA 1993, Packing Group III.

15. REGULATORY INFORMATION

EPA SARA TITLE III

Section 302 EPCRA Extremely Hazardous Substances (EHS)

Product Component	CAS No.	Wt%	RQ, lb	TPQ, lb
Hydrogen Sulfide	7783-00-4	0-0.04	100	500

Section 304 CERCLA Hazardous Substances

Product Component	CAS No.	Wt%	RQ, lb
Hydrogen Sulfide	7783-00-4	0-0.04	100

Section 311/312 Hazard Categorization

Acute:	Chronic:	Fire:	Pressure:	Reactive:
X	X	X		

Section 313 EPCRA Toxic Substances

Product Component	CAS No.	Wt. %
Hydrogen Sulfide	7783-00-4	0-0.04

Key: RQ = Reportable Quantity
TPQ = Threshold Planning Quantity of EHS

16. OTHER INFORMATION

THIS INFORMATION RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. SUCH INFORMATION IS TO THE BEST OF THIS COMPANY'S KNOWLEDGE AND BELIEVED ACCURATE AND RELIABLE AS OF THE DATE INDICATED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE IS MADE AS TO THE ACCURACY, RELIABILITY OR COMPLETENESS. IT IS THE USER'S RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF SUCH INFORMATION FOR THEIR OWN PARTICULAR USE.

This is the end of MSDS A0007b.msdl

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Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 1 of 13

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Product Description: Hydrocarbons and Additives

Product Code: 123455-20, 9700, 977032, 977217, 977306, 977360, 977371, 977381, 977445, 977562, 977767, 977920, 979533, 97A039, 97A065, 97A078, 97A087, 97A102, 97A108, 97A146, 97A147, 97A152, 97A193, 97A200, 97A240, 97A266, 97A273, 97A290, 97A305, 97A316, 97A317, 97A328, 97A347, 97A380, 97A404, 97A424, 97A431, 97A441, 97A514, 97A556, 97A557, 97A613, 97A634, 97A653, 97A655, 97A659, 97A686, 97A696, 97A703, 97A712, 97A726, 97A736, 97A746, 97A767, 97A794, 97A798, 97A827, 97A848, 97A851, 97A876, 97A883, 97A907, 97A934, 97A948, 97A949, 97A960, 97A983, 97A989, 97AW38, 97C070, 97C072, 97C075, 97C110, 97C112, 97C113, 97C118, 97C127, 97C140, 97C148, 97C166, 97C417, 97C558, 97C576, 97C632, 97C702, 97C731, 97C759, 97C770, 97C782, 97C794, 97C870, 97C917, 97D130, 97D228, 97E002, 97E010, 97E041, 97E065, 97E087, 97E103, 97E104, 97E11, 97E112, 97E113, 97E170, 97E171, 97E196, 97E197, 97E259, 97E260, 97E304, 97E305, 97E347, 97E42, 97E532, 97E564, 97E581, 97E595, 97E606, 97E611, 97E619, 97E649, 97E655, 97E66, 97E682, 97E749, 97E860, 97E88, 97E999, 97F005, 97F020, 97F030, 97F054, 97F312, 97F344, 97F952, 97M190, 97M191, 97M192, 97M193, 97M194, 97M195, 97M229, 97M230, 97M232, 97N832, 97N844, 97N861, 97N873, 97N879, 97N891, 97N895, 97N917, 97N921, 97N954, 97Q303, 97Q763, 97Q781, 97Q782, 97R368, 97S760, 97X861, EMGF20

Intended Use: Fuel, Gasoline

COMPANY IDENTIFICATION

Supplier: EXXON MOBIL CORPORATION
3225 GALLOWES RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency 609-737-4411
Transportation Emergency Phone 800-424-9300
ExxonMobil Transportation No. 281-834-3296
MSDS Requests 713-613-3661
Product Technical Information 800-662-4525, 800-947-9147
MSDS Internet Address <http://www.exxon.com>, <http://www.mobil.com>

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
ETHYL ALCOHOL	64-17-5	< 11%
GASOLINE	86290-81-5	89 - 100%

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*
BENZENE	71-43-2	0.1 - 5%
ETHYL BENZENE	100-41-4	1 - 5%
N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
TOLUENE	108-88-3	5 - 10%

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 2 of 13

TRIMETHYL BENZENE	25551-13-7	1 - 5%
XYLENES	1330-20-7	5 - 10%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

NOTE: The concentration of the components shown above may vary substantially. In certain countries, benzene content may be limited to lower levels. Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present. Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane, and isopentane. The reportable component percentages, shown in the composition/information on ingredients section, are based on API's evaluation of a typical gasoline mixture.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Extremely flammable. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

POTENTIAL HEALTH EFFECTS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organs: Lung | Skin |

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health: 1	Flammability: 3	Reactivity: 0
HMIS Hazard ID:	Health: 1*	Flammability: 3	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 3 of 13

before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Benzene- Individuals with liver disease may be more susceptible to toxic effects.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Sulfur oxides, Aldehydes, Oxides of carbon, Incomplete combustion products

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-40C (-40F) [ASTM D-56]

Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6

Autoignition Temperature: >250°C (482°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 4 of 13

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put fuel into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be grounded and



Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Revision Date: 29Jun2007
Page 5 of 13

bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			Note	Source
BENZENE		OSHA Action level	0.5 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	5 ppm		N/A	OSHA Sp.Reg.
BENZENE		TWA	1 ppm		N/A	OSHA

Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Revision Date: 29Jun2007
Page 5 of 13

bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			Note	Source
BENZENE		OSHA Action level	0.5 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	5 ppm		N/A	OSHA Sp.Reg.
BENZENE		TWA	1 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm		Skin	ACGIH
ETHYL ALCOHOL		TWA	1900 mg/m3	1000 ppm	N/A	OSHA Z1
ETHYL ALCOHOL		TWA	1000 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
ETHYL BENZENE		STEL	125 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	100 ppm		N/A	ACGIH
GASOLINE	Vapor.	TWA	300 mg/m3	100 ppm	N/A	ExxonMobil
GASOLINE		STEL	500 ppm		N/A	ACGIH
GASOLINE		TWA	300 ppm		N/A	ACGIH
N-HEXANE		TWA	1800 mg/m3	500 ppm	N/A	OSHA Z1
N-HEXANE		TWA	50 ppm		Skin	ACGIH
NAPHTHALENE		TWA	50 mg/m3	10 ppm	N/A	OSHA Z1
NAPHTHALENE		STEL	15 ppm		Skin	ACGIH
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)		TWA	25 ppm		N/A	ACGIH
TOLUENE		Ceiling	300 ppm		N/A	OSHA Z2
TOLUENE		Maximum concentration	500 ppm		N/A	OSHA Z2
TOLUENE		TWA	200 ppm		N/A	OSHA Z2
TRIMETHYL BENZENE		TWA	25 ppm		N/A	ACGIH
XYLENES		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
XYLENES		STEL	150 ppm		N/A	ACGIH
XYLENES		TWA	100 ppm		N/A	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Revision Date: 29Jun2007
Page 6 of 13

The level of protection and types of controls necessary will vary depending upon potential exposure conditions.
Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly affect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Color: Clear (May Be Dyed)
Odor: Petroleum/Solvent
Odor Threshold: N/D

Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Revision Date: 29Jun2007
Page 7 of 13

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.74
Flash Point [Method]: <-40C (-40F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 20C (68F)
Vapor Density (Air = 1): 3 at 101 kPa
Vapor Pressure: > 26.6 kPa (200 mm Hg) at 20 C
Evaporation Rate (n-butyl acetate = 1): > 10
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3
Solubility in Water: Negligible
Viscosity: <1 cSt (1 mm²/sec) at 40 C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Alkalies, Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Moderately irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	

Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 8 of 13

Irritation: Data available.

May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapors in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk.

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Gasoline unleaded: Caused cancer in animal tests. Chronic inhalation studies resulted in liver tumors in female mice and kidney tumors in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations In Vitro or In Vivo. Negative in inhalation developmental studies and reproductive tox studies. Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing).

Contains:

BENZENE: Caused cancer (leukemia), damage to the blood-producing system, and serious blood disorders from prolonged, high exposure based on human epidemiology studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus in laboratory animal studies. **ETHANOL:** Prolonged or repeated exposure to high concentrations of ethanol vapor or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring.

NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain. **N-HEXANE:** Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.

TOLUENE: Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects.

TRIMETHYLBENZENE: Long-term inhalation exposure of trimethylbenzene caused effects to the blood in laboratory animals.

ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

Additional information is available by request.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 3, 6
ETHYL BENZENE	100-41-4	5

Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Revision Date: 29Jun2007
Page 9 of 13

GASOLINE	86290-81-5	5
NAPHTHALENE	91-20-3	2, 5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC
2 = NTP SUS

3 = IARC 1
4 = IARC 2A

5 = IARC 2B
6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Majority of components -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY. TCLP (BENZENE)

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and



Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 10 of 13

can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
-------------------	------------------------------

LAND (DOT)

Proper Shipping Name: GASOLINE

Hazard Class & Division: 3

ID Number: 1203

Packing Group: II

ERG Number: 128

Label(s): 3

Transport Document Name: UN1203, GASOLINE, 3, PG II

LAND (TDG)

Proper Shipping Name: GASOLINE

Hazard Class & Division: 3

UN Number: 1203

Packing Group: II

Special Provisions: 17

SEA (IMDG)

Proper Shipping Name: MOTOR SPIRIT or GASOLINE or PETROL

Hazard Class & Division: 3

EMS Number: F-E, S-E

UN Number: 1203

Packing Group: II

Label(s): 3

Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-40°C c.c.)

AIR (IATA)

Proper Shipping Name: GASOLINE

Hazard Class & Division: 3

UN Number: 1203

Packing Group: II

Label(s): 3

Transport Document Name: UN1203, GASOLINE, 3, PG II

SECTION 15	REGULATORY INFORMATION
-------------------	-------------------------------

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

CERCLA: This material is not subject to any special reporting under the requirements of the Comprehensive



Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Revision Date: 29Jun2007
Page 11 of 13

Environmental Response, Compensation and Liability Act (CERCLA). Contact local authorities to determine if other reporting requirements apply.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
N-HEXANE	110-54-3	1 - 5%
ETHYL BENZENE	100-41-4	1 - 5%
XYLENES	1330-20-7	5 - 10%
BENZENE	71-43-2	0.1 - 5%
NAPHTHALENE	91-20-3	<1%
TOLUENE	108-88-3	5 - 10%

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 2, 4, 10, 11, 13, 15, 16, 17, 18, 19
ETHYL ALCOHOL	64-17-5	1, 4, 13, 16, 17, 18, 19
ETHYL BENZENE	100-41-4	1, 4, 10, 13, 16, 17, 18, 19
GASOLINE	86290-81-5	1, 18
N-HEXANE	110-54-3	1, 4, 13, 16, 17, 18, 19
NAPHTHALENE	91-20-3	1, 4, 5, 10
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1, 13, 16, 17, 18, 19
TOLUENE	108-88-3	4, 11, 13, 15, 16, 17, 18, 19
TRIMETHYL BENZENE	25551-13-7	1, 13, 16, 17, 18, 19
XYLENES	1330-20-7	1, 4, 5, 13, 15, 16, 17, 18, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

No revision information is available.

THIS MSDS COVERS THE FOLLOWING MATERIALS: ESSO EXTRA MIDGRADE UNLEADED | ESSO MIDGRADE UNLEADED | ESSO PREMIUM UNLEADED | ESSO REGULAR UNLEADED | ESSO SUPER PREMIUM UNLEADED | EXXON MIDGRADE UNLEADED | EXXON PREMIUM UNLEADED | EXXON REGULAR UNLEADED | GASOLINE | INDOLINE GASOLINE | MIDGRADE UNLEADED | MOBIL EXTRA UNLEADED |



Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 12 of 13

MOBIL REGULAR UNLEADED | MOBIL SPECIAL UNLEADED | MOBIL SUPER UNLEADED | PREMIUM UNLEADED | REGULAR UNLEADED | UNLEADED GASOLINE

PRECAUTIONARY LABEL TEXT:

Contains: BENZENE, GASOLINE

DANGER!

HEALTH HAZARDS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organs: Lung | Skin |

PHYSICAL HAZARDS

Extremely flammable. Material can accumulate static charges which may cause an incendiary electrical discharge. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

PRECAUTIONS

Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures.

FIRST AID

Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water. If irritation occurs, get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

SPILL/LEAK

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.



Product Name: GASOLINE, UNLEADED AUTOMOTIVE

Revision Date: 29Jun2007

Page 13 of 13

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of this product.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

Internal Use Only

MHC: 1A, 0, 0, 0, 3, 1

PPEC: CF

DGN: 2000316XUS (1011203)

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EPAPA005000999



Material Safety Data Sheet

Material Name: 44K®

MSDS ID: 208

*** Section 1 - Chemical Product and Company Identification ***

Part Number: 208, 208A, 2081, 2085, 20816, 20830, 20853

Product Use: Gasoline Additive

Manufacturer Information

BG Products Inc.
701 S. Wichita Street
Wichita, KS 67213

Phone: (316) 265-2686
Fax: (316) 265-0718
Emergency # 1-800-424-9300 (CHEMTREC)

*** Section 2 - Hazards Identification ***

Emergency Overview

WARNING:

- Combustible liquid. Do not use or store near flames, sparks, or hot surfaces.
- This product is irritating to the eyes and skin.
- This product may be harmful by inhalation.
- This product may be harmful if it is swallowed.

HMIS Ratings: Health: 1 Fire: 2 Physical Hazard: 0 Pers. Prot.: B

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

*** Section 3 - Composition / Information on Ingredients ***

CAS #	Component	Percent
Mixture	Petroleum distillates	40-70
8052-41-3	Mineral spirits	20-25

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following:
Naphtha (petroleum), hydrotreated heavy, Petroleum distillates, hydrotreated light, Petroleum naphtha, light aromatic.

Component Information

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication). This product is considered a controlled product under the Canadian Controlled Products Regulations (CPR).

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of contact, immediately flush eyes with large amounts of water, continuing to flush for 15 minutes. If irritation persists get medical attention.

First Aid: Skin

For skin contact flush with large amounts of water while removing contaminated clothing. If irritation persists, get medical attention.

First Aid: Ingestion

If ingested, get immediate medical attention. Do not induce vomiting unless instructed to do so by medical personnel.

First Aid: Inhalation

Move person to non-contaminated air. Give artificial respiration if not breathing. Call a physician if symptoms develop or persist.



Material Safety Data Sheet

Material Name: 44K®

MSDS ID: 208

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.
Keep away from heat, sparks, or open flame.

Hazardous Combustion Products

Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Extinguishing Media

Dry chemical, foam, carbon dioxide.

Fire Fighting Equipment/Instructions

Fire fighters should wear full-face, self contained breathing apparatus and impervious protective clothing.
Fire fighters should avoid inhaling any combustion products.

NFPA Ratings: Health: 1 Fire: 2 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Contain the discharged material. Remove sources of ignition.

Clean-Up Procedures

Wear appropriate protective equipment and clothing during clean-up. Absorb spill with inert material.
Shovel material into appropriate container for disposal.

Evacuation Procedures

Isolate area. Keep unnecessary personnel away. In case of large spills, follow all facility emergency response procedures.

Special Procedures

Wear appropriate personal protective equipment.

*** Section 7 - Handling and Storage ***

Handling Procedures

Avoid getting this material into contact with your skin and eyes. Wash thoroughly after handling. Use this product with adequate ventilation. Keep container closed.

Storage Procedures

Do not store this material in open or unlabeled containers. Store this product in air-tight containers away from sources of heat and light.

*** Section 8 - Exposure Controls / Personal Protection ***

A: Component Exposure Limits

Mineral spirits (8052-41-3)

ACGIH: 100 ppm TWA
OSHA: 100 ppm TWA; 525 mg/m3 TWA
NIOSH: 350 mg/m3 TWA
1800 mg/m3 Ceiling (15 min)



Material Safety Data Sheet

Material Name: 44K®

MSDS ID: 208

B: Canadian Provincial Exposure Limits

Petroleum distillates (Mixture)

British Columbia: 200 mg/m3 TWA (as total hydrocarbon vapour) (related to Jet fuels)
Columbia: Skin notation (related to Jet fuels)

Mineral spirits (8052-41-3)

Alberta: 100 ppm TWA; 572 mg/m3 TWA
British Columbia: 290 mg/m3 TWA
Columbia: 580 mg/m3 STEL
Manitoba: 100 ppm TWA; 525 mg/m3 TWA
New Brunswick: 100 ppm TWA; 525 mg/m3 TWA
NW Territories: 100 ppm TWA; 575 mg/m3 TWA
125 ppm STEL; 720 mg/m3 STEL
Nova Scotia: 100 ppm TWA
Nunavut: 100 ppm TWA; 575 mg/m3 TWA
125 ppm STEL; 720 mg/m3 STEL
Ontario: 525 mg/m3 TWAEV
Quebec: 100 ppm TWAEV; 525 mg/m3 TWAEV
Saskatchewan: 525 mg/m3 TWA; 100 ppm TWA
656 mg/m3 STEL; 125 ppm STEL
Yukon: 100 ppm TWA; 575 mg/m3 TWA
150 ppm STEL; 720 mg/m3 STEL

Engineering Controls

Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses; chemical goggles (if splashing is possible).

Personal Protective Equipment: Skin

Use appropriate hand protection.

Personal Protective Equipment: Respiratory

Use NIOSH approved respirator with cartridge, air line, or SCBA as appropriate based on workplace exposure evaluations.

Personal Protective Equipment: General

Use good industrial hygiene practices in handling this material.

*** Section 9 - Physical & Chemical Properties ***

Appearance:	Light yellow liquid	Odor:	Solvent
Physical State:	Liquid	Flash Point:	43°C (110°F)
Flash Point Method:	PMCC	Boiling Point:	156°C (312°F)
Melting Point:	Not Determined	Pour Point:	<-48°C (-55°F)
Specific Gravity:	0.8533	Bulk Density:	7.114 lbs/gal
Solubility (H2O):	Insoluble	Vapor Pressure:	Not Available
Vapor Density:	Not Available	Auto Ignition:	Not Available
Lower Flammability Limit:	Not Available	Upper Flammability Limit:	Not Available
pH:	Not Available		

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

Stable under normal conditions.



Material Safety Data Sheet

Material Name: 44K®

MSDS ID: 208

Chemical Stability: Conditions to Avoid

Keep away from heat, ignition sources and incompatible materials. Avoid strong oxidizing agents.

Incompatibility

This product may react with oxidizing agents. Strong oxidizing agents (peroxides, chlorine, strong acids).

Hazardous Decomposition

Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Possibility of Hazardous Reactions

Will not occur.

*** Section 11 - Toxicological Information ***

Acute Dose Effects

A: General Product Information

An LD50 value for this product has not been determined.

B: Component Analysis - LD50/LC50

Petroleum distillates (Mixture)

Oral LD50 Rat: >5000 mg/kg; Dermal LD50 Rabbit: >3160 mg/kg (related to Naphtha (petroleum), hydrotreated heavy)

Carcinogenicity

A: General Product Information

No carcinogenicity data available for this product.

B: Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

*** Section 12 - Ecological Information ***

Ecotoxicity

No information available for the product.

*** Section 13 - Disposal Considerations ***

Waste Disposal Instructions

Dispose of in accordance with all applicable Federal, State, Provincial, and local regulations.

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: Petroleum Lubricating Oil, Not Regulated

IMDG Information

Shipping Name: Flammable Liquid, n.o.s. (contains Mineral Spirits and Petroleum Distillates)

UN #: 1993 Hazard Class: 3 Packing Group: III Flash Point: 43°C

Required Label(s): Flammable; Limited Quantity if less than or equal to 5L

IATA Information

Shipping Name: Flammable Liquid, n.o.s. (contains Mineral Spirits and Petroleum Distillates)

UN #: 1993 Hazard Class: 3 Packing Group: III Flash Point: 43°C

Required Label(s): Flammable; Limited Quantity if less than or equal to 5L



Material Safety Data Sheet

Material Name: 44K®

MSDS ID: 208

*** Section 15 - Regulatory Information ***

US Federal Regulations

Components of this product have been checked against the non-confidential TSCA inventory by CAS Registry Number. Components not identified on this non-confidential inventory are exempt from listing (i.e. as polymers) or are listed on the confidential inventory as declared by the supplier.

A: Component Analysis

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

B: Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Mineral spirits	8052-41-3	Yes	DSL	EINECS

State Regulations

Other state regulations may apply. Check individual state requirements.

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Mineral spirits	8052-41-3	Yes	Yes	Yes	Yes	Yes	Yes

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Mineral spirits	8052-41-3	1 %

*** Section 16 - Other Information ***

Other Information

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use. You must notify each person to whom this mixture or trade name product is sold. This statement must not be detached. Any copy or redistribution of the Material Safety Data Sheet shall include this statement.

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; CAS = Chemical Abstract Services; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; CPR = Controlled Product Regulations; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EPA = Environmental Protection Agency; HMIS = Hazardous Materials Information System; IARC = International Agency for Research on Cancer; IATA = International Air Transport Association; IDL = Ingredient Disclosure List; IMDG = International Maritime Dangerous Goods; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Agency; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; TSCA = Toxic Substance Control Act; WHMIS = Workplace Hazardous Materials Information System.

End of MSDS 208



ALDON CORPORATION


MATERIAL SAFETY DATA SHEET

221 Rochester Street
Avon, New York 14414-9409
(585) 226-6177

MSDS No.: RR0090
Effective Date: March 24, 2005

SECTION I NAME 24 HOUR EMERGENCY ASSISTANCE

Product	Fertilizer
Chemical Synonyms	Plant Nutrient
Formula	Mixture. See Section II.
Unit Size	up to 1 Kg.
C.A.S. No.	Mixture. See Section II.



CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

HAZARD RATING
MINIMAL SLIGHT MODERATE SERIOUS SEVERE
0 1 2 3 4

Health	1
Fire	0
Reactivity	0

HMIS *

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Contains: Ammonium phosphate: (CAS 7722-76-1)	-----	None established.
Potassium nitrate: (CAS 7757-79-1)	-----	None established.
Urea: (CAS 57-13-6)	-----	None established.

CAUTION! MAY BE HARMFUL IF SWALLOWED.

SECTION III PHYSICAL DATA

Melting Point (°F)	N/A	Specific Gravity (H ₂ O = 1)	N/A
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	Complete.		
Appearance & Odor	Green, crystalline solid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	N/A	Lower	Upper
Extinguisher Media	Use any media suitable for extinguishing supporting fire.				

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Fire or excessive heat may produce hazardous decomposition products.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA

Threshold Limited Value

None established for this material or its components. (ACGIH 2001).

Effects of Overexposure

Specific data is not available. May be harmful by ingestion or inhalation. May cause irritation. Exercise appropriate procedures to minimize potential hazards. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable	Conditions to Avoid	Excessive temperature and heat
	Stable	X	

Incompatibility (Materials to Avoid) None known.

Hazardous Decomposition Products Thermal decomposition or burning may produce oxides of nitrogen and phosphorous, ammonia.

Hazardous Polymerization	Conditions to Avoid
May Occur	Will Not Occur
	X
	Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled Recover for use if not contaminated. Sweep up and place in suitable container for proper disposal. Wash spill area with soap and water.

Waste Disposal Method Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with all Federal, State and Local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection None needed in normal laboratory handling. If dusty conditions prevail, wear a NIOSH/MSHA-approved respirator.

Ventilation	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves Rubber. **Eye Protection** Chemical safety glasses.

Other Protective Equipment Lab coat, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing Store in a cool, dry place. Wash thoroughly after handling. Keep container tightly closed when not in use.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Do not take internally. Remove and wash contaminated clothing.

Revision No. 3 Date 03/24/05 Approved Michael Raszeja Chemical Safety Coordinator MR

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. * Hazardous Materials Industrial Standards. Printed on recycled paper.

Material Safety Data Sheet

Gluconic acid, zinc salt hydrate

ACC# 15782

Section 1 - Chemical Product and Company Identification

MSDS Name: Gluconic acid, zinc salt hydrate

Catalog Numbers: AC392010000

Synonyms: Zinc gluconate hydrate

Company Identification:

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Gluconic acid, zinc salt hydrate		unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available. Appearance: white powder.

Not available.

Target Organs: None known.

Potential Health Effects

Eye: May cause eye irritation.

Skin: May cause skin irritation. May be harmful if absorbed through the skin.

Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.

Inhalation: May cause respiratory tract irritation. May be harmful if inhaled.

Chronic: Not available.

Section 4 - First Aid Measures

s: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Get medical aid. Wash mouth out with water.

Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Flash Point: Not available.

Autoignition Temperature: > 155 deg C (> 311.00 deg F)

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Avoid breathing dust, mist, or vapor. Avoid contact with skin and eyes. Avoid ingestion and inhalation.

Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Gluconic acid, zinc salt hydrate	none listed	none listed	none listed
Zinc, bis(D-gluconato-O1,O2)-	none listed	none listed	none listed

OSHA Vacated PELs: Gluconic acid, zinc salt hydrate: No OSHA Vacated PELs are listed for this chemical. Zinc, bis(D-gluconato-O1,O2)-: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Powder

Appearance: white

Odor: odorless

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: Not available.

Freezing/Melting Point: Not available.

Decomposition Temperature: Not available.

Solubility: 100 g/l (20°C)

Specific Gravity/Density: Not available.

Molecular Formula: C₁₂H₂₂O₁₄Zn.xH₂O

Molecular Weight: 455.68

Section 10 - Stability and Reactivity

Chemical Stability: Not available.

Conditions to Avoid: Incompatible materials.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 4468-02-4: ZH3750000

LD50/LC50:

CAS# 4468-02-4:

Oral, mouse: LD50 = 1290 mg/kg;

Mutagenicity:

4468-02-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.

Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:		No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

Gluconic acid, zinc salt hydrate is not listed on the TSCA inventory. It is for research and development use only.

CAS# 4468-02-4 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

ERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 4468-02-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations**European Labeling in Accordance with EC Directives****Hazard Symbols:**

Not available.

Risk Phrases:**Safety Phrases:**

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 4468-02-4: 0

Canada - DSL/NDL

CAS# 4468-02-4 is listed on Canada's DSL List.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List**Section 16 - Additional Information**

MSDS Creation Date: 2/08/2007

Revision #0 Date: Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of

the possibility of such damages.

Material Safety Data Sheet

Version 3.1
Revision Date 05/17/2007
Print Date 08/22/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Glycerol**
Product Number : G9012
Brand : Sigma-Aldrich
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₃H₈O₃
Molecular Weight : 92.09 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
Glycerol			
56-81-5	200-289-5	-	-

3. HAZARDS IDENTIFICATION**Emergency Overview****OSHA Hazards**

Delayed target organ effects
Mild skin irritant
Mild eye irritant

Target Organs

Kidney

HMIS Classification

Health Hazard: 1
Chronic Health Hazard: *
Flammability: 1
Physical hazards: 0

NFPA Rating

Health Hazard: 1
Fire : 0
Reactivity Hazard: 1

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Skin
Eyes
Ingestion

May be harmful if absorbed through skin. May cause skin irritation.
May cause eye irritation.
May be harmful if swallowed.

4. FIRST AID MEASURES

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point 160 °C (320 °F) - closed cup

Ignition temperature 370 °C (698 °F)

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid breathing vapors, mist or gas.

Environmental precautions

Do not let product enter drains.

Methods for cleaning up

Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Glycerol	56-81-5	TWA	10 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on

					Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Inhalable fraction. See Appendix C, paragraph A. Inhalable Particulate Mass TLVs (IPM-TLVs) for those materials that are hazardous when deposited anywhere in the respiratory tract.				
		TWA	5 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	5 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	15 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
		TWA	5 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

Personal protective equipment

Respiratory protection

Respiratory protection is not required. Where protection is desired, use multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Safety glasses

Hygiene measures

General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	clear
Odour	odourless

Safety data

pH	5.5
Melting point	20 °C (68 °F)
Boiling point	182 °C (360 °F) at 26.7 hPa (20.0 mmHg) 290 °C (554 °F) 290 °C (554 °F)
Flash point	160 °C (320 °F) - closed cup
Ignition temperature	370 °C (698 °F)
Lower explosion limit	0.9 %(V)
Vapour pressure	< 0.13 hPa (< 0.10 mmHg) at 20 °C (68 °F)
Density	1.2620 g/cm3 1.2610 g/cm3
Water solubility	soluble

10. STABILITY AND REACTIVITY**Storage stability**

Stable under recommended storage conditions.

Materials to avoid

Strong bases, Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.

Carbon oxides

11. TOXICOLOGICAL INFORMATION**Acute toxicity**

LD50 Oral - rat - 12,600 mg/kg

LC50 Inhalation - rat - 1 h - > 570 mg/m3

LD50 Dermal - rabbit - > 10,000 mg/kg

Irritation and corrosion

Skin - rabbit - Mild skin irritation - 24 h

Eyes - rabbit - Mild eye irritation - 24 h

Sensitization

no data available

Chronic exposure

no data available

Signs and Symptoms of Exposure

prolonged or repeated exposure can cause:, Nausea, Headache, Vomiting

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Ingestion
Target Organs

May be harmful if swallowed.
Kidney,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish

LC50 - Carassius auratus (goldfish) - > 5,000 mg/l

LC50 - Pimephales promelas (fathead minnow) - 44,000 mg/l

LC50 - other fish - > 100,100 mg/l

LC50 - Oncorhynchus mykiss (rainbow trout) - 67,500 mg/l - 96 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product

Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards

Delayed target organ effects, Mild skin irritant, Mild eye irritant

TSCA Status

On TSCA Inventory

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Glycerol

CAS-No.
56-81-5

Revision Date
1991-07-01

Pennsylvania Right To Know Components

Glycerol

CAS-No.
56-81-5

Revision Date
1991-07-01

New Jersey Right To Know Components

Glycerol

CAS-No.
56-81-5

Revision Date
1991-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only., The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **GLYCOLIC ACID**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: GLYCOLIC ACID

Synonyms: None

Chemical Family: Organic acid

Application: Acid

Manufacturer/Supplier: Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By: Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Glycolic acid		60 - 100%	3 ppm	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview: May cause eye, skin, and respiratory burns. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Reacts with metals to generate flammable hydrogen gas. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 3, Flammability 0, Reactivity 0
HMIS Ratings: Flammability 0, Reactivity 0, Health 3

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralize to pH of 6-8. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from alkalis. Store in a cool well ventilated area. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Acid gas respirator.

Hand Protection Impervious rubber gloves.

Skin Protection Full protective chemical resistant clothing.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Color: Amber
Odor: Mild burnt sugar

GLYCOLIC ACID
Page 2 of 6

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	1-2
Specific Gravity @ 20 C (Water=1):	1.27
Density @ 20 C (lbs./gallon):	10.6
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	212
Boiling Point/Range (C):	100
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers. Contact with metals. Avoid halogens. Mercury. Silver. Cyanides.
Hazardous Decomposition Products	Flammable hydrogen gas. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Causes severe respiratory irritation.
Skin Contact	Causes severe burns.
Eye Contact	May cause eye burns.
Ingestion	Causes burns of the mouth, throat and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	Prolonged, excessive exposure may cause erosion of the teeth.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	LD50: 4240 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable

Bio-accumulation	Not Determined
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Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information	Not determined
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Other Information	Not applicable
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13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
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Contaminated Packaging	Follow all applicable national or local regulations.
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14. TRANSPORT INFORMATION

Land Transportation

DOT

Corrosive Liquid, Acidic, Organic, N.O.S., 8, UN3265, II
(Contains Glycolic Acid)
NAERG 153

Canadian TDG

Corrosive Liquid, Acidic, Organic, N.O.S.(Contains Glycolic Acid), 8, UN3265, II

ADR

UN3265, Corrosive Liquid, Acidic, Organic, N.O.S.(Contains Glycolic Acid), 8, II

Air Transportation

ICAO/IATA

UN3265, Corrosive Liquid, Acidic, Organic, N.O.S., 8, II
(Contains Glycolic Acid Solution)

Sea Transportation

IMDG

UN3265, Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Glycolic Acid), 8, II
EmS F-A, S-B

Other Shipping Information

Labels: Corrosive

15. REGULATORY INFORMATION**US Regulations**

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Corrosivity D002
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS

Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
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Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

4-18-07

#32

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Texaco Starplex®

Product Use: Grease

Product Number(s): CPS221927, CPS221935

Synonyms: Texaco Starplex® 1, Texaco Starplex® 2

Company Identification

Chevron Products Company

Global Lubricants

6001 Bollinger Canyon Road

San Ramon, CA 94583

United States of America

Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

Health Emergency

Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623

Product Information

email: lubemsds@chevrontexaco.com

Product Information: 800-LUBE-TEK

MSDS Requests: 800-414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	70 - 95 %wt/wt
Zinc dialkyldithiophosphate	68649-42-3	1 - 5 %wt/wt

SECTION 3 HAZARDS IDENTIFICATION

IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

Ingestion: Not expected to be harmful if swallowed

Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of mist of vapors at levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

FIRE CLASSIFICATION:

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

Flashpoint: (Cleveland Open Cup) 200 °C (392 °F) (Min)

Autoignition: No Data Available

Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.

Spill Management: Clean up spills immediately, observing precautions in Exposure Controls/Personal Protection section.

Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

Precautionary Measures: Keep out of the reach of children.

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION**GENERAL CONSIDERATIONS:**

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Neoprene, Nitrile Rubber, Silver Shield, Viton.

Respiratory Protection: No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--
Highly refined mineral oil (C15 - C50)	OSHA Z-1	5 mg/m3	--	--	--

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Varies depending on specification

Physical State: Semi-solid

Odor: Petroleum odor

pH: Not Applicable

Vapor Pressure: <0.01 mmHg @ 20 °C (68 °F)

Vapor Density (Air = 1): >1

Boiling Point: No Data Available

Solubility: Soluble in hydrocarbon solvents; insoluble in water.

Melting Point: No Data Available

Specific Gravity: 0.9

Viscosity: 15 cSt @ 100°C (212°F) (Min)

Evaporation Rate: No Data Available

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: None known (None expected)

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION**IMMEDIATE HEALTH EFFECTS**

Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.

Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.

Skin Sensitization: No product toxicology data available.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B). These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.

ENVIRONMENTAL FATE

This material is not expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: PETROLEUM LUBRICATING GREASE; NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

Additional Information: NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

IMO/MDG Shipping Description: PETROLEUM LUBRICATING GREASE; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: PETROLEUM LUBRICATING GREASE; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES: 1. Immediate (Acute) Health Effects: NO

2. Delayed (Chronic) Health Effects: NO

3. Fire Hazard: NO

4. Sudden Release or Pressure Hazard: NO

5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

The following components of this material are found on the regulatory lists indicated.

Zinc dialkyldithiophosphate 03, 06

CHEMICAL INVENTORIES:

All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), EINECS (European Union), KECI (Korea), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: PICCS (Philippines).

NEW JERSEY RTK CLASSIFICATION:

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Grease)

WHMIS CLASSIFICATION:

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products Regulations.

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 1 Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

LABEL RECOMMENDATION:

Label Category : GREASE 1 - GRS1

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 15

Revision Date: July 26, 2006

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
CVX - Chevron	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI

MSDS Standard (Z400.1) by the Chevron Energy Technology Company, 100 Chevron Way, Richmond, California 94802.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SOCHEM

Material Safety Data Sheet



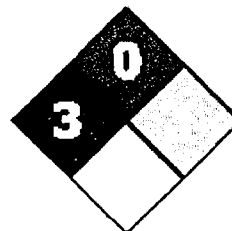
PPE



HMIS

	3
	0
Reactivity	1

NFPA



Preparation Date 03-Jun-2008

Revision Date

Revision Number 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code L-GR CAUSTIC 18-30%
Product Name Lo-Grade Caustic 18-30%
Contact Manufacturer
Sochem Solutions, Inc.
P. O. box 1912
Gonzales, LA 70707
225-644-3180
Emergency Telephone Number CHEMTREC: (call 24 Hours) 1-800-424-9300
or for International calls dial 703-527-3887 (collect calls accepted)

Application of Substance/the preparation Industrial Cleaning Chemical

2. HAZARDS IDENTIFICATION

Emergency Overview

- The product causes burns of eyes, skin and mucous membranes

Eye contact	• Causes eye burns
Skin contact	• It will cause burns and irritation
Inhalation	• Avoid breathing vapors or mists
Ingestion	• Severe damage to the gastrointestinal tract
Principle Routes of Exposure	Eye contact Skin contact Ingestion Inhalation
Aggravated Medical Conditions	• Existing dermatitis

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight %	EINECS
50% Liquid caustic soda	1310-73-2	18-30	-

29CFR Part 1910, Subpart Z (OSHA) Toxic and Hazardous Substances

Part 355, Appendix A (Extermly Hazardous Substances) EPA

TLV for Chemcial Substances

Annual Report on Carcinogens

Supplier: Material Safety Data Sheets

4. FIRST AID MEASURES

- | | |
|---------------------|---|
| Skin Contact | <ul style="list-style-type: none">• Wash with Large amounts of water |
| Eye Contact | <ul style="list-style-type: none">• Flush with water for 15 mintues• Consult a physician |
| Inhalation | <ul style="list-style-type: none">• Remove to fresh air• If breathing has stopped, call a physician |
| Ingestion | <ul style="list-style-type: none">• Do not induce vomiting• Drink large quantity of water, and consult physician |

5. FIRE-FIGHTING MEASURES

- | | |
|-------------------------------------|--|
| Suitable Extinguishing Media | <ul style="list-style-type: none">• Use extinguishing measures that are appropriate to local circumstances and the surrounding environment |
| Special Protective Equipment | <ul style="list-style-type: none">• None |

6. ACCIDENTAL RELEASE MEASURES

- | | |
|----------------------------------|---|
| Personal Precautions | <ul style="list-style-type: none">• Ensure adequate ventilation |
| Environmental Precautions | <ul style="list-style-type: none">• Stop flow and contain spill• Small spill: Pick up with absorbent material• Neutralize before disposal |
| Methods for Clean-up | <ul style="list-style-type: none">• Neutralized• Flush with water to sewer.• Follow Federal, State and Local regulations• Large spill reclaim, put in containers |

7. HANDLING AND STORAGE

Handling**Safe Handling Advice**

- Handle in accordance with good industrial hygiene and safety practice

Storage

- Keep container tightly closed
- Do not store in aluminum containers or use with soft metal parts.

Incompatible products

- Strong Acid

Specific use(s)

- None

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Chemical Name	OSHA PEL	ACGIH TWA
50% Liquid caustic soda	2 mg/m ³	N/A

Personal Protective Equipment**Respiratory Protection**

- In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit

Hand Protection

- Rubber gloves
- Neoprene gloves
- Any chemical resistant gloves

Eye/face Protection

- Chemical goggles
- Face-shield

Skin Protection

- Wear protective gloves/clothing
- Rubber or plastic boots

General Hygiene Considerations

- Avoid breathing mist

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Semi viscous Clear Liquid	Color	• Clear
Physical State	• Semi viscous liquid	pH	14
Flash Point	N/A	Autoignition Temperature	
Boiling Point/Range	288°F		
Solubility	Complete in water	Vapor Density	Not est.
Bulk Density	10.60	Viscosity	Not available

10. STABILITY AND REACTIVITY

Chemical Stability

- Stable

Incompatible Materials

- Strong acids

Hazardous Decomposition Products

- None under normal use

Hazardous Polymerization

- Hazardous polymerisation does not occur

Possibility of Hazardous Reactions

- None under normal processing

11. TOXICOLOGICAL INFORMATION**Local effects****cause irritation****Eye irritation****Inhalation****Ingestion**

Causes burns. Irritating to skin. dryness of skin.

Corrosive to the eyes and may cause severe damage including blindness.

May cause irritation of respiratory tract.

Ingestion causes burns of the upper digestive and respiratory tracts.

Long term Effects**12. ECOLOGICAL INFORMATION****Ecotoxicity effects**

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants

Additional ecological information

No information available

13. DISPOSAL CONSIDERATIONS**Waste Disposal Method**

Follow Federal, state and Local regulations.. Large Spill: Reclaim, put in containers. Neutralize before disposal. Flush spill area with water and neutralize with dilute acid if necessary. Do not use aluminum equipment.. Small Spill: Pick up with absorbent material.. Neutralize. Flush with water.

Contaminated Packaging

Keep container closed when not in use.

Further information

Wash contaminated clothing before reuse

14. TRANSPORT INFORMATION**DOT****Proper Shipping Name**

HM-SODIUM HYDROXIDE, SOLUTION CORROSIVE LABEL

Hazard Class

8

UN-No

1824

Packing Group

II

ERG Code

ERG-154

15. REGULATORY INFORMATION**R -phrase(s)**

None

S -phrase(s)

None

Symbol(s)

Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 99/45/EC

EU Labeling

None

Contains

None

U.S. Inventories

Chemical Name	TSCA	NJRTK	MRTKL	PARTK
50% Liquid caustic soda		N/A		

International Inventories

Chemical Name	TSCA	DSL	EINECS	ENCS	IECSC	KECL	PICCS	AICS
50% Liquid caustic soda	-	-	-	-	-	-	-	-

16. OTHER INFORMATION

Prepared By

Sochem Solutions, Inc.

End of MSDS